Appendix F – HDR Survey of Waters of the U.S. for Transmission Line Upgrades Memo

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Waters of the U.S. Memo for Proposed Transmission Line Upgrades for the Kingston Fossil Plant Retirement Project

Date:	Friday, December 02, 2022
Project:	Kingston Fossil Plant Retirement
To:	Tennessee Valley Authority (TVA)
From:	Lyranda Thiem, HDR Engineering, Inc. Misty Huddleston, HDR Engineering, Inc.
Subject:	Summary of Waters of the U.S. features for the proposed transmission line upgrades associated with Alternative A the Kingston Fossil Plant Retirement EIS, Roane County, Tennessee

HDR Engineering, Inc (HDR) conducted an environmental site assessment of transmission lines proposed for upgrades under Alternative A of the Kingston Fossil Plant Retirement EIS Project in Kingston, Roane County, Tennessee on behalf of Tennessee Valley Authority (TVA). Under Alternative A, TVA would make improvements to existing transmission lines within the Kingston Reservation, including new transmission line (TL) connections to the proposed CC/CT facilities and switch station. The 3,872.96-acre Project study area consists of TL access roads (existing and proposed new) and two TL segments -one to the west of the Kingston Reservation (Western Segment) and one to the east (Eastern Segment). The following Ecological Resources and Inventory Report (ERIR) memorandum includes the site description, methodology, and results of the site assessment.

Preliminary Data Review

Prior to the field investigation, resource information pertaining to the Project study area was gathered from:

- Aerial imagery via ESRI and Google Earth Software (Figure 1 and 2),
- United States Geologic Survey (USGS) 7.5-minute quadrangle maple (Figure 3),
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (Figure 4),
- USGS National Hydrography Dataset (NHD) mapped streams (Figure 5),
- U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) mapped wetlands (Figure 5), and
- Federal Emergency Management Agency (FEMA) Map Service Center (Figure 5).

Western Transmission Line Corridor

A review of the NHD dataset indicates that the western transmission corridor and access roads cross streams in 19 locations and waterbodies in 6 locations, totaling 5,619 linear feet of stream and 3.88 acres of open water within the transmission line corridor. In addition, the NWI

database identified 27 locations where wetlands may be crossed by the western transmission line corridor and access roads, totaling 5.21 acres of open water, 3.66 acres of forested wetland, and 1.98 acres of emergent wetlands (Figure 5). According to the FEMA floodplain database, the central portion of the TL is located within a 100-year floodplain (Zone AE), which FEMA defines as an area subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods (FEMA 2022). According to the USDA NRCS Soil Survey of Cumberland County, TN, there are 18 soil map units within the Project study area (Appendix E). Of these soil units, Atkins loam (At) and Bonair loam (Bo) were listed as having hydric components.

Eastern Transmission Line Corridor

Based on a review of the NHD dataset, the eastern TL corridor and access roads cross streams in approximately 63 locations and waterbodies in 10 locations, with 21,832 linear feet of stream and 18.46 acres of open water falling within the transmission line corridor. In addition, the NWI database identified 81 wetland locations, totaling 40.1 acres, within or crossed by the eastern TL corridor and access roads (Figure 5). According to the FEMA floodplain database, the Project study area is located within two 100-year floodplains and within four regulatory floodways. A regulatory floodway is defined as the channel of a river or other watercourse and the adjacent land areas that may be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (FEMA 2022).

According to the USDA NRCS Soil Survey of Roane County, TN, there are 44 soil map units within the Project study area (Appendix E). Of these soil units, Capshaw silt loam (CaB), Colbert-Lyerly Rock outcrop complex (CbD), Cedarbluff loam (Cd), Chenneby silt loam (Ce), and Hamblen silt loam (Hb) were listed as having hydric components.

Jurisdictional Delineation and Hydrological Determination

On June 6th through 10th, June 13th through 17th, and June 20th through 24th, HDR environmental scientists Lyranda Thiem (QHP-IT), Jon Calderon Brandt, Braxton Eden, Josh Mace, Jenessa Kay, Garrett Reinsfelder, Lindsey Hue, and Blake Hartshorn (QHP-IT) reviewed the Project study area for jurisdictional waters of the U.S. (WOUS) under Section 404 of the Clean Water Act. Jurisdictional WOUS were delineated according to the methodology and guidance described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Rapanos Guidance, and the USACE Eastern Mountains and Piedmont Region Regional Supplement (Version 2.0) (Regional Supplement) (USACE 2012). Wetland features were classified according to the Cowardin naming convention (Cowardin et al. 1979). Streams were classified according to the guidance outlined in USACE Regulatory Guidance Letter 05-05-Ordinary High Water Mark Identification (USACE 2005) and the Tennessee Department of Environment & Conservation (TDEC) Division of Water Pollution Control Guidance for Making Hydrologic Determinations (Version 1.5) (TDEC 2020). Potential jurisdictional wetlands and streams were flagged in the field and recorded using a Trimble® GPS unit capable of sub-meter accuracy; GPS data were post-processed utilizing Trimble ® GPS Pathfinder Office Software and imported into ESRI ArcGIS software where data were reviewed and edited for quality. Physical characteristics of wetlands and waterbodies were recorded on USACE wetland

determination forms, TDEC Tennessee Rapid Assessment Method (TRAM) forms, and/or TDEC Hydrologic Determination data forms (Appendix B). Representative photographs are provided in Appendix D.

A pedestrian Survey for potential federally protected terrestrial wildlife and their suitable habitat as well as a survey of suitable habitat for federally protected plant species was performed throughout the 3,872.96-acre Project study area.

Results

Thirty-five (35) perennial streams, twenty-two (22) intermittent streams, seventeen (17) ephemeral streams, twenty-four (24) upland drainage features, seven (7) open waters, thirty-two (32) palustrine emergent wetlands (PEM), seven (7) palustrine forested wetlands (PFO), three (3) Palustrine Scrub-Shrub (PSS) wetlands, three (3) PEM/PSS wetlands, three (3) PEM/PFO wetlands, and one (1) PSS/PFO Wetland were identified within the Project study area during the field survey (Appendix D). No other waterbodies were identified. A summary of delineated features is provided below.

USACE Non-Jurisdictional Features

Ten (10) potentially non-jurisdictional palustrine emergent (PEM) wetlands totaling 1.07 acres, one (1) non-jurisdictional open water totaling 1.19 acres, and twenty-four (24) non-jurisdictional upland drainage features totaling 6,165 linear feet occur within the Project study area. These features were determined likely non-jurisdictional and not regulated by USACE.

NON-JURISDICTIONAL WETLANDS

Wetlands 1,3,4,10,16,19,23,29,30, and 34 are isolated PEM wetlands within the Project study area and total approximately 1.07 acres (Table 1). The primary hydrologic input for these wetlands is surface runoff from surrounding upslope areas. These non-jurisdictional wetlands were not identified in the NHD or NWI databases of mapped waterbodies or on the USGS topographic map. These non-jurisdictional wetlands are located outside of floodplains and do not exhibit direct hydrologic connections to Traditionally Navigable Water (TNW) or other type of jurisdictional feature. Therefore, these wetlands are likely non-jurisdictional isolated wetlands not regulated by the USACE.

Table 1. Non-Jurisdictional Wetland Features within the Project Study Area

Wetland ID	Type	Cowardian Classification[1]	Latitude/ Longitude	Data Point (DP) No. Wet/ Up	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Non-Jurisdictional Wetland 1	Non-tidal; Non-Section 404	PEM1	36.015845°/-85.050127°	DP1-W1/ DP2-UP1	1 (West)	1	0.19 ac
Non-Jurisdictional Wetland 3	Non-tidal; Non-Section 404	PEM1	36.013965°/-85.044934°	DP6-W3/ DP7-UP3	1 (West)	3	0.03 ac
Non-Jurisdictional Wetland 4	Non-tidal; Non-Section 404	PEM1	36.012835°/-85.041765°	DP8-W4/ DP9-UP4	2 (West)	4	0.19 ac

Wetland ID	Type	Cowardian Classification[1]	Latitude/ Longitude	Data Point (DP) No. Wet/ Up	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Non-Jurisdictional Wetland 10	Non-tidal; Non-Section 404	PEM1	36.000731°/-85.010591°	DP20-W10/ DP21-UP10	6 (West)	10	0.06 ac
Non-Jurisdictional Wetland 16	Non-tidal; Non-Section 404	PEM1	35.989622°/-84.98442°	DP34-W16/ DP35-UP17	7 (West)	16	0.11 ac
Non-Jurisdictional Wetland 19	Non-tidal; Non-Section 404	PEM1	35.916667°/-84.471224°	DP40-W19/ DP41-UP20	14 (East)	19	0.19 ac
Non-Jurisdictional Wetland 23	Non-tidal; Non-Section 404	PEM1	35.919253°/-84.462020°	DP48-W23/ DP49-UP24	14 (East)	23	0.12 ac
Non-Jurisdictional Wetland 29	Non-tidal; Non-Section 404	PEM1	35.927300°/-84.402255°	DP61-W29/ DP62-UP30	23 (East)	29	0.12 ac
Non-Jurisdictional Wetland 30	Non-tidal; Non-Section 404	PEM1	35.927923°/-84.403228°	DP63-W30/ DP62-UP30	23 (East)	30	0.05 ac.
Non-Jurisdictional Wetland 34	Non-tidal; Non-Section 404	PEM1	35.947278°/-84.387772°	DP68-W34/ DP69-UP34	24 (East)	34	0.01 ac
Total Non-Jurisdictional Wetland Features within the Project Study Area							**1.07 ac**

1) PEM: Palustrine Emergent Wetland

NON-JURISDICTIONAL OPEN WATER

There is one non-jurisdictional open water (farm pond) located within the Project study area (Open Water 5), totaling approximately 1.19 acres (Table 2). Open Water 5 has been an agricultural farm pond since at least 1985 and was excavated in uplands. During the survey, Open Water 5 was surrounded by TVA ROW and forested area (Appendix A, Figure 14). Open Water 5 is located outside of the floodplain, does not replace a stream or wetland based on NHD/NWI, and does not exhibit direct hydrologic connection to a TNW or other type of jurisdictional feature. Open Water 5 is likely used for agricultural purposes and therefore, is likely a non-jurisdictional farm pond not regulated by the USACE.

Table 2. Non-Jurisdictional Open Water Feature within the Project Study Area

Open Water ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Open Water 5	Open Water	Open Water 5	35.918438°/-84.466508°	PUBHh	14	5 (East)	1.19 ac
Total Upland Drainage Features within the Project Study Area							**1.19 ac**

1) PUBHh: Palustrine Unconsolidated bottom, permanently flooded

UPLAND DRAINAGE FEATURE

Upland Drainage Feature 1 through Upland Drainage Feature 25 (24 features total) are erosional gullies located within the Project study area (Table 3), totaling approximately 6,156 linear feet (Appendix A). These upland drainage features do not have an ordinary high-water mark (OHWM). During the site visit no standing water was observed within the channel. These features are wet weather conveyances (WWCs) that drain uplands, do not carry a relatively

permanent flow of water, do not replace existing stream or wetland features, and have no connection to TNWs or other jurisdictional features. Therefore, Upland Drainage Feature 1 through Upland Drainage Feature 25 (24 features total) do not provide intermittent or perennial flow to a jurisdictional water and are likely non-jurisdictional and not regulated by the USACE.

Table 3. Non-Jurisdictional Upland Drainage Features within the Project Study Area

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardin Classification[1]	Figure No.	Photo No.	Estimated Length of Aquatic Resource in Project Study Area
Upland Drainage Feature 1	Erosional Gully	Upland Drainage Feature 1/ WWC 8	35.937113°/-84.421117°	R6	18 (East)	183,184	213 linear feet
Upland Drainage Feature 2	Erosional Gully	Upland Drainage Feature 2/ WWC 9	35.936802°/-84.421426°	R6	18 (East)	185,186	191 linear feet
Upland Drainage Feature 3	Erosional Gully	Upland Drainage Feature 3/ WWC 10	35.934211°/-84.422809°	R6	19 (East)	187,188	226 linear feet
Upland Drainage Feature 4	Erosional Gully	Upland Drainage Feature 4/ WWC 11	35.939214°/-84.410925°	R6	21 (East)	189,190	308 linear feet
Upland Drainage Feature 5	Erosional Gully	Upland Drainage Feature 5/ WWC 12	35.940649°/-84.413421°	R6	21 (East)	191,192	275 linear feet
Upland Drainage Feature 6	Erosional Gully	Upland Drainage Feature 6/ WWC 13	35.941584°/-84.409905°	R6	21 (East)	193,194	1020 linear feet
Upland Drainage Feature 7	Erosional Gully	Upland Drainage Feature 7/ WWC 17	35.951341°/-84.360019°	R6	29 (East)	195,196	351 linear feet
Upland Drainage Feature 8	Erosional Gully	Upland Drainage Feature 8/ WWC 17a	35.955798°/-84.357793°	R6	28 (East)	197,198	216 linear feet
Upland Drainage Feature 9	Erosional Gully	Upland Drainage Feature 9/ WWC 18	35.973250°/-84.340878°	R6	26 (East)	199,200	737 linear feet
Upland Drainage Feature 10	Erosional Gully	Upland Drainage Feature 10/ WWC 19	35.972666°/-84.341094°	R6	29 (East)	201,202	669 linear feet
Upland Drainage Feature 11	Erosional Gully	Upland Drainage Feature 11/ WWC 21	35.988349°/-84.328472°	R6	34 (East)	203,204	77 linear feet
Upland Drainage Feature 12	Erosional Gully	Upland Drainage Feature 12/ WWC 23	35.992170°/-84.324660°	R6	35 (East)	205,206	72 linear feet
Upland Drainage Feature 14*	Erosional Gully	Upland Drainage Feature 14/ WWC 26	36.006217°/-84.312111°	R6	37 (East)	207,208	246 linear feet
Upland Drainage Feature 15	Erosional Gully	Upland Drainage Feature 15/ WWC 27	36.007512°/-84.310343°	R6	37 (East)	209,210	85 linear feet
Upland Drainage Feature 16	Erosional Gully	Upland Drainage Feature 16/ WWC 28	36.018912°/-84.299864°	R6	38 (East)	211,212	248 linear feet

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardin Classification[1]	Figure No.	Photo No.	Estimated Length of Aquatic Resource in Project Study Area
Upland Drainage Feature 17	Erosional Gully	Upland Drainage Feature 17/ WWC 29	36.025986°/-84.294582°	R6	39 (East)	213	34 linear feet
Upland Drainage Feature 18	Erosional Gully	Upland Drainage Feature 18/ WWC 31	36.015559°/-84.275742°	R6	40 (East)	214,215	161 linear feet
Upland Drainage Feature 19	Erosional Gully	Upland Drainage Feature 19/ WWC 32	36.010572°/-84.271491°	R6	41 (East)	216,217	70 linear feet
Upland Drainage Feature 20	Erosional Gully	Upland Drainage Feature 20/ WWC 34	36.001073°/-84.261043	R6	42 (East)	218,219	209 linear feet
Upland Drainage Feature 21	Erosional Gully	Upland Drainage Feature 21/ WWC 35	35.999292°/-84.257671	R6	42 (East)	220,221	245 linear feet
Upland Drainage Feature 22	Erosional Gully	Upland Drainage Feature 22/ WWC 37	35.923554°/-84.335052°	R6	46 (East)	222,223	230 linear feet
Upland Drainage Feature 23	Erosional Gully	Upland Drainage Feature 23/ WWC 38	35.926594°/-84.330692°	R6	46 (East)	224,225	185 linear feet
Upland Drainage Feature 24	Erosional Gully	Upland Drainage Feature 24/ WWC 20	35.979274°/ -84.317523°	R6	33 (East)	226,227	17 linear feet
Upland Drainage Feature 25	Erosional Gully	Upland Drainage Feature 25/ WWC 16	35.932734°/-84.336385°	R6	29 (East)	228,229	71 linear feet
Total Upland Drainage Features within the Project Study Area							**6,156** linear feet

1) R6: A wetland, spring, stream, river, pond, or lake that only exists for a short period

* The upland drainage feature numbering system skips 13, going from 12 to 14 due to errors made during field surveys. Drainage numbering begins at 1 and ends at 25 although there are only 24 features in total.

USACE Jurisdictional Features

Thirty-nine (39) jurisdictional wetlands (Table 4), seven (7) jurisdictional open waters (Table 5), and seventy-two (72) jurisdictional streams (Table 6) potentially occur within the Project study area. Jurisdictional wetlands delineated total approximately 20.1 acres and include 22 PEM wetlands (11.27 acres), 7 palustrine forested (PFO) wetlands (0.65 acres), 3 palustrine scrub-shrub wetlands (0.14 acres), 3 PEM/PFO wetlands (3.63 acres), 3 PEM/PSS wetlands (4.02 acres), and 1 PFO/PSS wetland (0.39 acres). Identified jurisdictional linear waters include approximately 18,730 linear feet of stream channel. These features were determined likely jurisdictional and regulated by USACE. See provided datasheets in Appendix B for reasonings behind delineations and determinations.

WETLANDS

Table 4. Jurisdictional Wetland Features within the Project Study Area

Wetland ID	Type	Cowardian Classification[1]	Latitude/ Longitude	Data Point (DP) No. Wet/ Up	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Wetland 2	Non-tidal; section 404	PEM1	36.014901°/ -85.046211	DP3-W2/ DP5-UP2	1 (West)	2	0.66 ac
Wetland 5	Non-tidal; section 404	PFO1	36.008885°/-85.031464°	DP11-W5/ DP12-UP6	3 (West)	5	0.08 ac
Wetland 6	Non-tidal; section 404	PEM1	36.005536°/-85.022705°	DP13-W6/ DP14-UP7	4 (West)	6	0.41 ac
Wetland 7	Non-tidal; section 404	PSS1	36.005558°/-85.021606°	DP15-W7/ DP17-UP8	4 (West)	7	0.12 ac
Wetland 8	Non-tidal; section 404	PEM1	36.003887°/-85.017372°	DP16-W8/ DP17-UP8	5 (West)	8	0.13 ac
Wetland 9	Non-tidal; section 404	PEM1	36.001451°/-85.011965°	DP18-W9/ DP19-UP9	5 (West)	9	0.17 ac
Wetland 11	Non-tidal; section 404	PEM1/PFO1	35.998973°/-85.006412°	DP22-W11/ DP23-UP11	6 (West)	11	3.88 ac
Wetland 12	Non-tidal; section 404	PEM1	35.996617°/-85.002772°	DP26-W12/ DP27-UP13	6 (West)	12	1.38 ac
Wetland 13	Non-tidal; section 404	PEM1	35.994324°/-84.995521°	DP28-W13/ DP29-UP14	8 (West)	13	0.67 ac
Wetland 14	Non-tidal; section 404	PEM1	35.993234°/-84.992439°	DP30-W14/ DP31-UP15	8 (West)	14	0.72 ac
Wetland 15	Non-tidal; section 404	PEM1	35.993021°/-84.992031°	DP33-W15/ DP32-UP16	8 (West)	15	0.04 ac
Wetland 17	Non-tidal; section 404	PEM1	35.914149°/-84.478822°	DP36-W17/ DP37-UP18	12 (East)	17	0.02 ac
Wetland 18	Non-tidal; section 404	PSS1	35.915674°/ -84.47362°	DP38-W18/ DP39-UP19	14 (East)	18	0.07 ac
Wetland 20	Non-tidal; section 404	PEM1	35.917268°/-84.468740°	DP42-W20/ DP43-UP21	14 (East)	20	0.28 ac
Wetland 21	Non-tidal; section 404	PEM1	35.917747°/-84.467428°	DP44-W21/ DP45-UP22	14 (East)	21	0.44 ac
Wetland 22	Non-tidal; section 404	PEM1	35.919204°/-84.464462°	DP46-W22/ DP47-UP23	14 (East)	22	0.15 ac
Wetland 24	Non-tidal; section 404	PEM1	35.919806°/-84.460770°	DP50-W24/ DP51-UP25	14 (East)	24	0.16 ac
Wetland 25	Non-tidal; section 404	PEM1	35.920480°/-84.457555°	DP52-W25/ DP53-UP26	15 (East)	25	0.14 ac
Wetland 26	Non-tidal; section 404	PSS1/PFO1	35.926067°/ 35.926067°	DP54-W26/ DP55-UP27	17 (East)	26	0.39 ac
Wetland 27	Non-tidal; section 404	PEM1	35.932806°/-84.420730°	DP56-W27/ DP57-UP28	19 (East)	27	0.09 ac
Wetland 28	Non-tidal; section 404	PEM1	35.936313°/-84.411968°	DP58-W28/ DP59-UP29	22 (East)	28	3.91 ac
Wetland 31	Non-tidal; section 404	PEM1	35.942531°/-84.413743°	DP64-W31/ DP65-UP32	21 (East)	31	0.16 ac
Wetland 32	Non-tidal; section 404	PEM1/PFO1	35.944227°/-84.397141°	DP67-W33/ DP66-UP33	25 (East)	32	0.83 ac
Wetland 33	Non-tidal; section 404	PEM1	35.944649°/-84.396618°	DP67-W33/ DP66-UP33	25 (East)	33	0.13 ac

Wetland ID	Type	Cowardian Classification[1]	Latitude/ Longitude	Data Point (DP) No. Wet/ Up	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Wetland 35	Non-tidal; section 404	PEM1	35.945894°/-84.385764°	DP70-W35/ DP71-UP35	27 (East)	35	0.95 ac
Wetland 36	Non-tidal; section 404	PFO1	35.947537°/-84.367221°	DP72-W36/ DP75-UP36	29 (East)	36	0.23 ac
Wetland 37	Non-tidal; section 404	PFO1	35.947482°/-84.366640°	DP73-W37/ DP75-UP36	29 (East)	37	0.16 ac
Wetland 38	Non-tidal; section 404	PFO1	35.947204°/-84.367025°	DP74-W38/ DP75-UP36	29 (East)	38	0.05 ac
Wetland 39	Non-tidal; section 404	PEM1/PFO1	35.947908°/-84.364273°	DP76-W39/ DP77-UP37	29 (East)	39	2.64 ac
Wetland 40	Non-tidal; section 404	PEM1	35.960537°/-84.352802°	DP78-W40/ DP79-UP38	32 (East)	40	0.12 ac
Wetland 41	Non-tidal; section 404	PFO1	35.966534°/-84.347361°	DP82-W41/ DP83-UP40	31 (East)	41	0.03 ac
Wetland 42	Non-tidal; section 404	PFO1A	35.969650°/-84.344710°	DP84-W42/ DP85-UP41	31 (East)	42	0.07 ac
Wetland 43	Non-tidal; section 404	PEM1	36.023624°/-84.295223°	DP86-W43/ DP87-UP42	39 (East)	43	0.06 ac
Wetland 44	Non-tidal; section 404	PEM1	36.004817°/-84.265689°	DP89-W44/ DP88-UP43	42 (East)	44	0.02 ac
Wetland 45	Non-tidal; section 404	PEM1	36.002553°/-84.263139°	DP91-W45/ DP92-UP45	42 (East)	45	0.53 ac
Wetland 46	Non-tidal; section 404	PEM1	35.923792°/-84.345068°	DP94-W46/ DP95-UP47	45 (East)	46	0.07 ac
Wetland 47	Non-tidal; section 404	PSS1	35.922853°/-84.335932°	DP96-W47/ DP97-UP48	47 (East)	47	0.08 ac
Wetland 48	Non-tidal; section 404	PSS1	35.934151°/-84.317672°	DP98-W48/ DP99-UP49	48 (East)	48	0.05 ac
Wetland 49	Non-tidal; section 404	PSS1	35.934044°/-84.317455°	DP98-W48/ DP99-UP49	48 (East)	49	0.01 ac
Total Jurisdictional Wetlands within the Project Study Area							**20.1 ac**

1) PEM: Palustrine emergent wetland
PSS: Palustrine Scrub/shrub Wetland
PFO: Palustrine Forested Wetland

OPEN WATERS

Table 5. Jurisdictional Open Water Features within the Project Study Area

Open Water ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Acreage of Aquatic Resource in Project Study Area
Open Water 1	Open Water	Open Water 1	36.016587°/-85.052343°	PUBHh	1 (West)	1	0.05 ac
Open Water 2	Open Water	Open Water 2	36.010617°/-85.035754°	PUBHh	3 (West)	2	0.84 ac
Open Water 3	Open Water	Open Water 3	35.997317°/-85.003067°	PUBHh	6 (West)	3	0.65 ac
Open Water 4	Open Water	Open Water 4	35.914236°/-84.479094°	PUBHh	12 (East)	4	0.02 ac
Open Water 6	Open Water	Open Water 6	35.918714°/-84.464903°	PUBHh	14 (East)	6	0.5 ac
Open Water 7	Open Water	Open Water 7	35.920114°/-84.460673°	PUBHh	14 (East)	7	0.12 ac
Open Water 8	Open Water	Open Water 8	35.934412°/-84.411171°	PUBHh	21 (East)	8	6.14 ac
Total Jurisdictional Open Waters within the Project Study Area							**8.32 ac**

1) PUBHh: Palustrine Unconsolidated bottom, permanently flooded

STREAMS

Table 6. Jurisdictional Stream Features within the Project Study Area

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Quantity of Aquatic Resource in Project Study Area
Stream 1	Intermittent	Stream 1	36.016987°/ -36.016987°	R4SB2	1 (West)	58,59	Length: 231 ft Width: 1-2 ft Area: 0.01 ac
Stream 2	Perennial	Stream 2	36.016242°/ -85.052529°	R3UB1	1 (West)	60,61	Length: 143 ft Width: 3-4 ft Area: 0.01 ac
Stream 3	Perennial	Stream 3	36.014680°/ -85.046744°	R3UB1	1 (West)	62,63	Length: 256 ft Width: 3-5 ft Area: 0.03 ac
Stream 4	Perennial	Stream 4	36.010006°/ -85.034433°	R3UB2	3 (West)	64,65	Length: 213 ft Width: 4-5 ft Area: 0.02 ac
Stream 5	Perennial	Obed River	36.009809°/ -36.009809°	R2UB	3 (West)	66,67	Length: 260 ft Width: 25-30 ft Area: 0.18 ac
Stream 6	Perennial	Rocky Branch	36.009146°/ -85.031181°	R3RS2	3 (West)	68,69	Length: 242 ft Width: 8-10 ft Area: 0.06 ac
Stream 7	Intermittent	Stream 7	36.009264°/ -85.031174°	R4SB1	3 (West)	70	Length: 89 ft Width: 8-10 ft Area: 0.02 ac
Stream 8	Perennial	Rocky Branch	36.008860°/ -85.030509°	R2UB	3 (West)	71,72	Length: 914 ft Width: 20-30 ft Area: 0.63 ac
Stream 9	Intermittent	Stream 9	36.005364°/ -85.014106°	R4SB5	4 (West)	73,74	Length: 253 ft Width: 1-2 ft Area: 0.01 ac
Stream 10	Intermittent	Stream 10	36.003468°/ -85.017315°	R4SB3	5 (West)	75	Length: 137 ft Width: 1-2 ft Area: 0.01 ac
Stream 11	Intermittent	Stream 11	35.999325º/-85.006704º	R4SB5	6(West)	272	Length: 211 ft Width: 2-3 ft Area: 0.01 ac
Stream 11b	Intermittent	Stream 11b	36.001122°/-85.011948°	R4SB5	5(West)	76,77	Length: 211 ft Width: 1-2 ft Area: <0.01 ac
Stream 12	Perennial	Rocky Branch	35.999158°/ -85.006913°	R2UB	6 (West)	78,79	Length: 272 ft Width: 10-15 ft Area: 0.09 ac
Stream 13	Intermittent	Stream 13	35.998308°/ -85.004438°	R4SB5	6 (West)	80,81	Length: 594 ft Width: 2-3 ft Area: 0.04 ac
Stream 14	Perennial	Clinch River	35.903219°/ -84.496374°	R2UB	10 (East)	82,83	Length: 317 ft Width: 8-10 ft Area: 0.07 ac
Stream 15	Perennial	Stream 15	35.915554°/ -84.473504°	R3UB2	14 (East)	84,85	Length:359 ft Width: 3-4 ft Area: 0.03 ac
Stream 16	Perennial	Stream 16	35.915887°/ -84.473859°	R5US1	14 (East)	86,87	Length:93 ft Width: 3-5 ft Area: <0.01 ac
Stream 17	Intermittent	Stream 17	35.916210°/-84.465146°	R4SB5	14 (East)	88	Length: 50 ft Width: 1-2 ft Area: <0.01 ac

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Quantity of Aquatic Resource in Project Study Area
Stream 18	Perennial	Stream 18	35.926098°/-84.438702°	R5UB1	17 (East)	89,90	Length:354 ft Width: 3-4 ft Area: 0.03 ac
Stream 19	Perennial	Stream 19	35.932714°/ -84.421228°	R5UB1	19 (East)	91,92	Length: 220 ft Width: 5 ft Area: 0.03 ac
Stream 20	Perennial	Clinch River	35.932442°/ -35.932442	R2UB	19 (East)	93	Length: 243 ft Width: 5-8 ft Area: 0.04 ac
Stream 21	Perennial	Poplar Creek	35.927439°/-84.401340°	R2UB	23 (East)	94	Length: 207 ft Width: 40-45 ft Area: 0.21 ac
Stream 22	Intermittent	Stream 22	35.942476°/-84.413553°	R4SB5	21 (East)	95,96	Length: 210 ft Width: 1-2 ft Area: 0.01 ac
Stream 23	Perennial	Poplar Creek	35.943845°/ -84.402642°	R2UB	21 (East)	97	Length: 1,165 ft Width: 20-25 ft Area: 0.67 ac
Stream 24	Perennial/ Intermittent	Stream 24	35.949303°/ -84.388392°	R5UB1/R4SB3	24 (East)	98,99	Length:165 ft Width: 4-5 ft Area: 0.01 ac
Stream 25	Perennial	Poplar Creek	35.946171°/ -84.386323°	R2UB	24, 27 (East)	100	Length: 406 ft Width: 2-3 ft Area: 0.03 ac
Stream 26	Intermittent	Stream 26	35.945696°/-84.384590°	R4SB5	27 (East)	101	Length: 345 ft Width: 3-4 ft Area: 0.03 ac
Stream 27	Perennial	East Fork Poplar Creek	35.949260°/-84.375516°	R2UB	26 (East)	102,103	Length: 710 ft Width: 20-25 ft Area: 0.41 ac
Stream 28	Perennial	Bear Creek	35.947714°/-84.368594°	R2UB	26 (East)	104,105	Length: 203 ft Width: 15-20 ft Area: 0.09 ac
Stream 29	Perennial	Bear Creek	35.947257°/ -84.366843°	R2UB	29 (East)	106	Length: 201 ft Width: 15-20 ft Area: 0.09 ac
Stream 30	Perennial	Bear Creek	35.948476°/-84.363732°	R2UB	29 (East)	107	Length: 281 ft Width: 15-20 ft Area: 0.09 ac
Stream 31	Perennial	Bear Creek	35.947146°/-84.363374°	R2UB	29 (East)	108	Length: 202 ft Width: 15-20 ft Area: 0.09 ac
Stream 32	Perennial	Stream 32	35.954115°/-84.359167°	R5UB1	29 (East)	109,110	Length: 230 ft Width: 5-6 ft Area: 0.02 ac
Stream 33	Perennial	Stream 33	35.954929°/-84.361512°	R5UB2	28 (East)	111,112	Length: 235 ft Width: 5-6 ft Area: 0.02 ac
Stream 34	Perennial	Stream 34	35.955049°/-84.361059°	R4SB5	28 (East)	113,114	Length: 107 ft Width: 1-3 ft Area: 0.01 ac
Stream 35	Intermittent	Stream 35	35.960713°/-84.353002°	R4SB5	32 (East)	115,116	Length: 175 ft Width: 3-5 ft Area: 0.02 ac
Stream 36	Perennial	Stream 36	35.963970°/-84.349514°	R5UB1	31 (East)	117,118	Length: 256 ft Width: 4-6 ft

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Quantity of Aquatic Resource in Project Study Area
							Area: 0.04 ac
Stream 37	Perennial	East Fork Poplar Creek	35.985150°/-84.330830°	R2UB	31 (East)	119,120	Length: 216 ft Width: 20-30 ft Area: 0.12 ac
Stream 37b	Intermittent	Stream 37b	35.985475º/-84.331274º	R4SB3	34 (East)	273	Length: 210 ft Width: 2-3 ft Area: 0.01 ac
Stream 38	Intermittent	Stream 38	35.987402°/ -84.329503°	R4SB3	34 (East)	121,122	Length: 221 ft Width: 1-3 ft Area: 0.02 ac
Stream 39	Intermittent	Stream 39	35.988449°/-84.328463°	R4SB3	34 (East)	123,124	Length: 229 ft Width: 2-3 ft Area: 0.02 ac
Stream 40	Intermittent	Stream 40	35.989711°/-84.327414°	R4SB3	35 (East)	125,126	Length: 182 ft Width: 3-4 ft Area: 0.02 ac
Stream 41	Intermittent	Stream 41	35.993755°/-84.323067°	R4SB3	35 (East)	127,128	Length: 251 ft Width: 3-4 ft Area: 0.02 ac
Stream 42	Intermittent	Stream 42	35.999347°/-84.318661°	R4SB3	36 (East)	129,130	Length: 227 ft Width: 1-3 ft Area: 0.02 ac
Stream 43	Intermittent	Stream 43	36.000043°/-84.317372°	R4SB3	36 (East)	131	Length: 120 ft Width: 2-4 ft Area: 0.01 ac
Stream 44	Perennial	Brushy Fork	36.023687°/-84.294953°	R2UB	39 (East)	132,133	Length: 222 ft Width: 20-25 ft Area: 0.13 ac
Stream 45	Perennial	Brushy Fork	36.024538°/-84.292644°	R2UB	39 (East)	134,135	Length: 238 ft Width: 10-15 ft Area: 0.08 ac
Stream 46	Perennial	Stream 46	36.022079°/-84.287760°	R5UB1	40 (East)	136,137	Length: 213 ft Width: 3-5 ft Area: 0.02 ac
Stream 47	Perennial	East Fork Poplar Creek	36.009421°/-84.269742°	R2UB	41 (East)	138,139	Length: 219 ft Width: 20-30 ft Area: 0.15 ac
Stream 48	Perennial	East Fork Poplar Creek	36.002783°/-84.263655°	R2UB	42 (East)	140,141	Length: 225 ft Width: 5-6 ft Area: 0.03 ac
Stream 49	Intermittent	Stream 49	36.002928°/-84.263495°	R4SB3	42 (East)	142	Length: 45 ft Width: 2-3 ft Area: <0.01 ac
Stream 50a	Perennial	Stream 50a	36.018996º/-84.299587º	R5UB1	38 (East)	274	Length: 41 ft Width: 3-4 Area: <0.1 ac
Stream 50b	Intermittent	Stream 50b	35.923100°/-84.336069°	R4SB3	38 (East)	143,144	Length: 253 ft Width: 2-4 ft Area: 0.01 ac
Stream 51	Intermittent	Stream 51	35.930342°/-84.326228°	R4SB3	47 (East)	145,146	Length: 247 ft Width: 2-4 ft Area: 0.02 ac
Stream 52	Perennial	Stream 52	35.933391°/-84.317469°	R5UB1	48 (East)	147,148	Length: 713 ft Width: 35-40 ft Area: 0.65 ac

Stream Segment ID	Type	Waterbody Name	Latitude/ Longitude	Cowardian Classification[1]	Figure No.	Photo No.	Estimated Quantity of Aquatic Resource in Project Study Area
Stream 53	Perennial	Stream 53	35.932734°/-84.317523°	R4SB3	48 (East)	149,150	Length: 46 ft Width: 35-40 ft Area: <0.01 ac
Stream 54	Ephemeral	Ephemeral 1/ WWC1	36.002224°/-85.014106°	R6	5 (West)	151,152	Length: 130 ft Width: 1-2 ft Area: 0.01 ac
Stream 55	Ephemeral	Ephemeral 2/ WWC2	36.001665°/-85.012190°	R6	5 (West)	153,154	Length: 55 ft Width: 1-2 ft Area: <0.01 ac
Stream 56	Ephemeral	Ephemeral 3/ WWC3	35.993222°/-84.992164°	R6	8 (West)	155,156	Length: 181 ft Width: 1-2 ft Area: 0.01 ac
Stream 57	Ephemeral	Ephemeral 4/ WWC4	35.992002°/-84.990570°	R6	8 (West)	157	Length: 179 ft Width: 1-2 ft Area: 0.01 ac
Stream 58	Ephemeral	Ephemeral 5/ WWC5	35.912327°/-84.481701°	R6	12 (East)	158,159	Length:775 ft Width: 1-2 ft Area: 0.04 ac
Stream 59	Ephemeral	Ephemeral 6/ WWC6	35.917849°/-84.468907°	R6	14 (East)	160,161	Length:185 ft Width: 1-2 ft Area: 0.01 ac
Stream 60	Ephemeral	Ephemeral 7/ WWC7	35.920213°/-84.458002°	R6	15 (East)	162,163	Length: 429 ft Width: 1-2 ft Area: 0.02 ac
Stream 61	Ephemeral	Ephemeral 8/ WWC14	35.944089°/-84.400698°	R6	25 (East)	164	Length: 104 ft Width: 4-5 ft Area: 0.01 ac
Stream 62	Ephemeral	Ephemeral 9/ WWC15	35.947349°/-84.376639°	R6	26 (East)	165,166	Length: 167 ft Width: 2-3 ft Area: 0.01 ac
Stream 63	Ephemeral	Ephemeral 11*/ WWC22	35.989260°/-84.327599°	R6	35 (East)	167,168	Length: 169 ft Width: 2-4 ft Area: 0.02 ac
Stream 64	Ephemeral	Ephemeral 12/ WWC24	35.996467°/-84.320449°	R6	35(East)	169,170	Length: 76 ft Width: 1-3 ft Area: <0.01 ac
Stream 65	Ephemeral	Ephemeral 13/ WWC25	36.001820°/-84.316064°	R6	36 (East)	171,172	Length: 79 ft Width: 1-2 ft Area: <0.01 ac
Stream 66	Ephemeral	Ephemeral 14/ WWC30	36.018182°/-84.279217°	R6	40 (East)	173,174	Length: 526 ft Width: 2-3 ft Area: 0.04 ac
Stream 67	Ephemeral	Ephemeral 15/ WWC33	36.004762°/-84.265852°	R6	42 (East)	175,176	Length: 93 ft Width: 1-2 ft Area: <0.01 ac
Stream 68	Ephemeral	Ephemeral 16/ WWC36	35.923750°/-84.345038°	R6	45 (East)	177,178	Length: 202 ft Width: 2-3 ft Area: 0.01 ac
Stream 69	Ephemeral	Ephemeral 17/ WWC39	35.933744°/-84.317490°	R6	48 (East)	179,180	Length: 409 ft Width: 1-2 ft Area: 0.02 ac
Stream 70	Ephemeral	Ephemeral 18/ WWC40	35.933275°/-84.317558°	R6	48 (East)	181,182	Length: 93 ft Width: 2-3 ft Area: <0.01 ac
Total Jurisdictional Streams within the Project Study Area							Length: 18,730 ft Area: 4.7 ac

* The ephemeral numbering system skips 10, going from 9 to 11 due to errors made during field surveys. Ephemeral begins at 1 and ends at 18 although there are only 17 features in total.
* The stream numbering system goes from 1-53 although this range includes 56 features in total, due to numbering errors made during field surveys.

TDEC Features

Tennessee state waters are regulated by TDEC, the agency that determines which watercourses require a permit prior to being altered. Two designations for watercourses are used by TDEC, streams (jurisdictional) and wet weather conveyances (WWC; non-jurisdictional).

TDEC JURISDICTIONAL WETLANDS

Wetlands 1-49 met all three wetland characteristics defined by the USACE. Therefore, Wetlands 1-49 are likely jurisdictional state waters regulated by TDEC.

TDEC JURISDICTIONAL OPEN WATERS

Open Waters 1-8 met characteristics defined by the USACE and are likely jurisdictional state waters regulated by TDEC.

TDEC JURISDICTIONAL STREAMS

Streams 1-53 (56 total features) exhibited characteristics of a stream as defined by TDEC and are likely jurisdictional state waters regulated by TDEC.

TDEC NON-JURISDICTIONAL WET WEATHER CONVEYANCES (WWC)

Features identified as WWC1 through WWC40 (41 total features) drain uplands, do not replace existing stream or wetland features, and do not carry relatively permanent flow of water (ephemeral). Therefore, WWC1 through WWC40 (41 total features) are likely non-jurisdictional WWCs and not regulated by TDEC.

Recommendations

Based on a desktop review and results of the field investigations, 24 upland drainage features totaling 6,156 linear feet are likely non-jurisdictional upland drainage features/erosional gullies which are not subject to Section 404 of the Clean Water Act. Further, one isolated open water and 10 isolated wetlands are likely non-jurisdictional and not subject to Section 404 of the Clean Water Act. Seventy-three streams, totaling 18,730 delineated linear feet (4.7 acres), 39 wetland features totaling 20.1 acres, and 7 open waters totaling 8.32 acres within the Project study area are likely jurisdictional and regulated by the USACE. Therefore, impacts these features would require Section 404 permits. The USACE Regulatory Division can officially render a final jurisdictional determination for Section 404 requirements through the formal review processor the features can be assumed to be jurisdictional based on the findings of this report and permitted accordingly. TVA will comply with any permitting and subsequent mitigation requirements.

The 24 upland drainage features were determined to not meet the definition of waters of the state and, therefore, are not regulated by TDEC and are not subject to Section 401 of the Clean Water Act.

The 49 delineated wetlands, 73 delineated streams, and 7 open waters were determined to be waters of the state and, therefore, are regulated by TDEC and subject to Section 401 of the Clean Water Act. TDEC can render an official hydrologic determination for Section 401 requirements, or the features can be assumed to be jurisdictional based on the findings of this report and permitted accordingly.

Based on a desktop review, field investigation, and current scope of the Project, the following clearances and permits are expected to be required

- CWA 401/TDEC Aquatic Resource Alteration Permit (ARAP)
- CWA 404 Permit
- NPDES Construction Stormwater Permit
- NPDES Facility Wastewater Permit (or modification of existing permit)

Conclusion

Seventeen USACE-jurisdictional ephemeral streams, 35 jurisdictional perennial streams, 22 jurisdictional intermittent streams, 7 jurisdictional open waters, and 39 jurisdictional wetlands (USACE and TDEC) were observed within the Project study area. Twenty-four non-jurisdictional drainage features, 10 non-jurisdictional wetlands, and 1 non-jurisdictional open waters were observed in the Project study area.

The reported results are limited to areas within the Project study area provided in Figure 6. Areas that fall outside of the Project study area boundary were not evaluated in the field and are not included in this report.

The field survey results presented herein apply to the existing site conditions at the time of our assessment. They cannot apply to site changes of which HDR is unaware and has not had the opportunity to review. Changes in the condition of a property may occur with time due to natural processes or human impacts at the Project site or on adjacent properties. Changes in applicable standards may occur due to legislation or the expansion of knowledge over time. Accordingly, the findings of this report may be invalidated, wholly or in part, by the changes beyond the control of HDR.

We appreciate the opportunity to assist TVA with this Project. If you have any questions regarding the findings summarized in this report, please feel free to contact me at 615.507.9167 or lyranda.thiem@hdrinc.com.

Sincerely,

HDR Engineering Inc.,

Lyranda Thiem

Misty Huddleston

Lyranda Thiem (QHP-IT)
Environmental Scientist

Misty Huddleston, Ph.D.
Environmental NEPA Lead

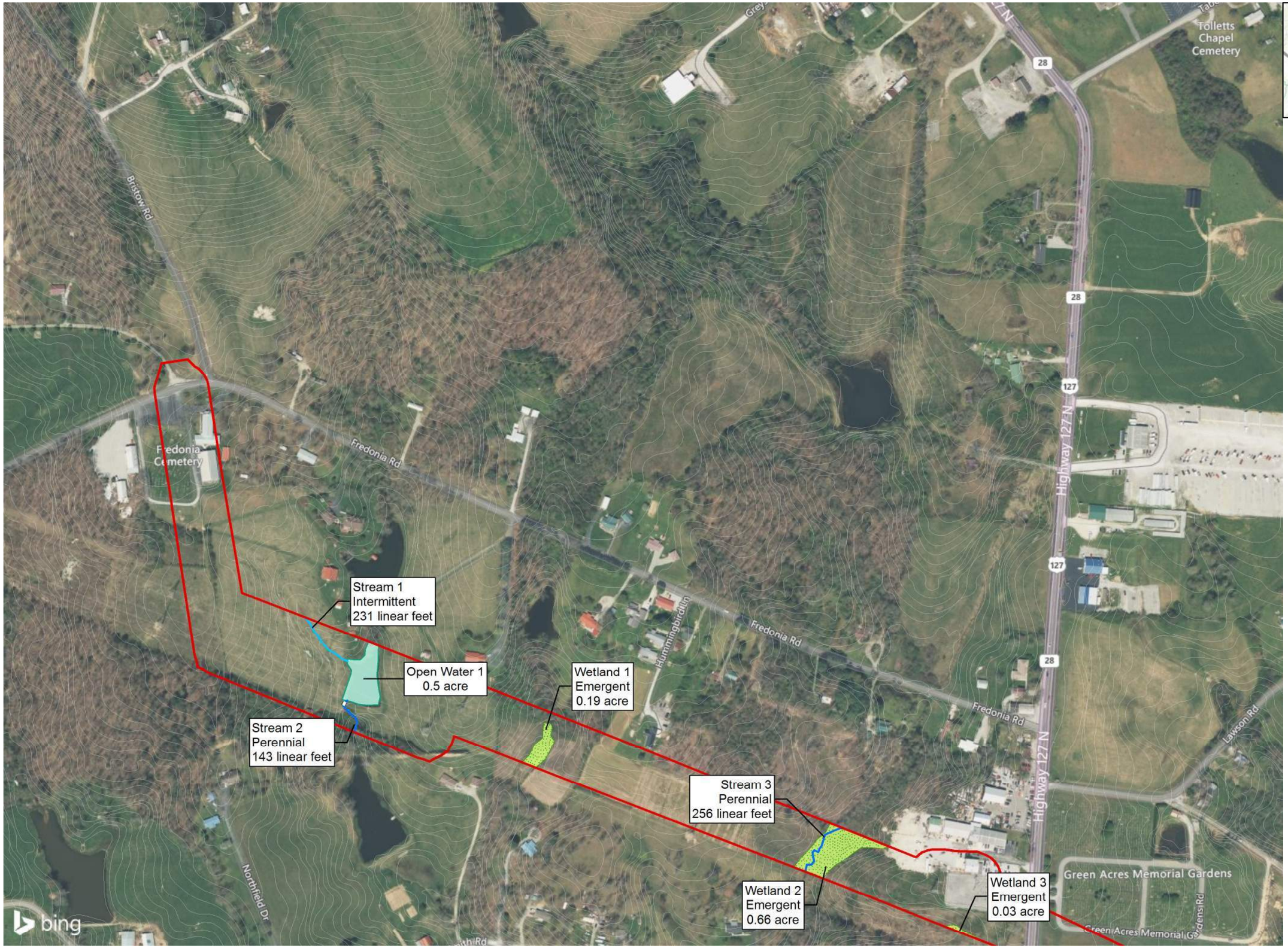
Attachments:

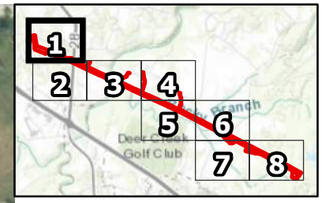
Appendix A: Figures
- *Figure 1- Project Vicinity Map*
- *Figure 2- Project Overview Map*
- *Figure 3- USGS Topographic Map*
- *Figure 4-NRCS Soil Survey of Roane County, TN*
- *Figure 5-NHD, NWI, and FEMA Flood Zones*
- *Figure 6-Delineated Waters*

Appendix B: Wetland and Stream Data Forms
Appendix C: Normal Weather Conditions
Appendix D: Photographs
Appendix E: Soils Summary

Appendix A

Jurisdictional Figures





KIINGSTON TRANSMISSION LINE - WEST

LEGEND

- Study Area
- Culvert
- Delineated Perennial Stream
- Delineated Intermittent Streams
- Wet Weather Conveyance
- HDR Delineated Stream
- HDR Delineated Open Water
- HDR Delineated Wetland

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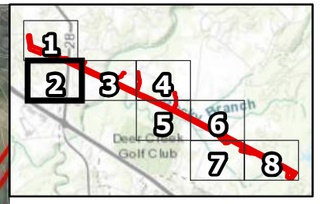
DATA SOURCE: Bing Hybrid Aerial Imagery



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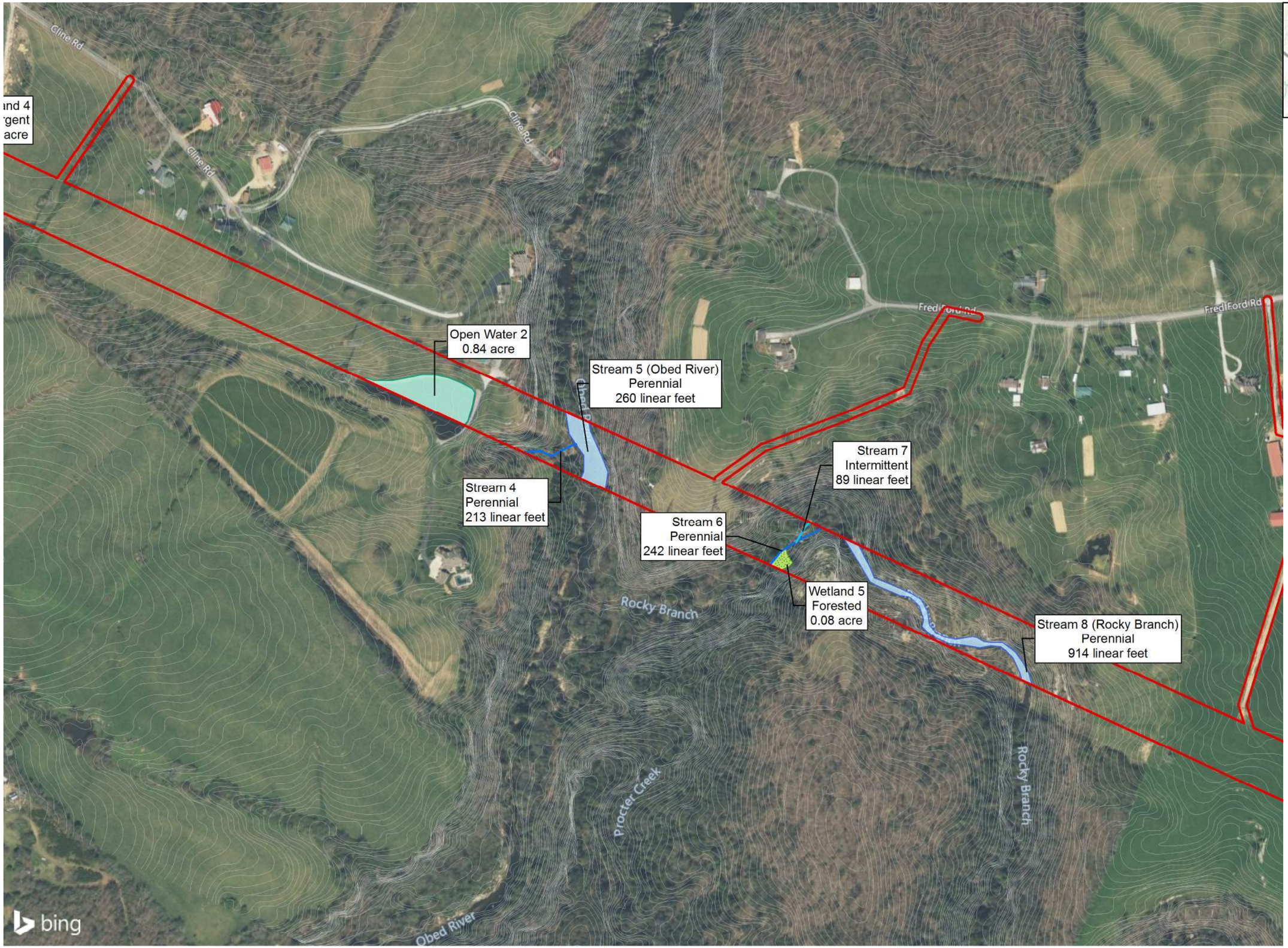

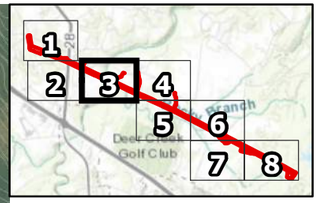

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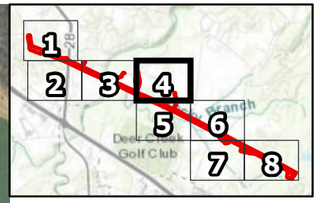

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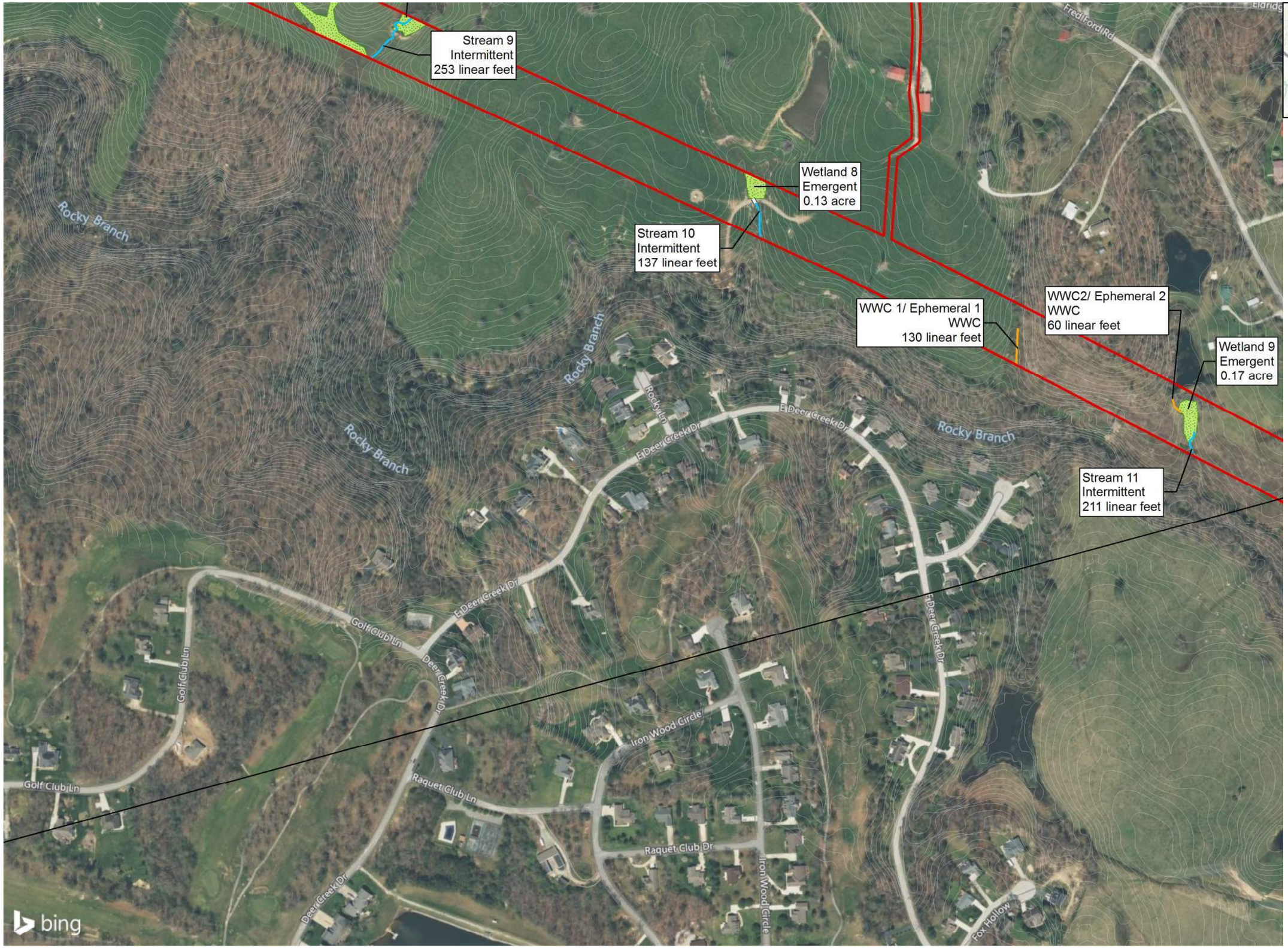

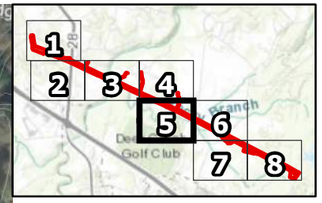

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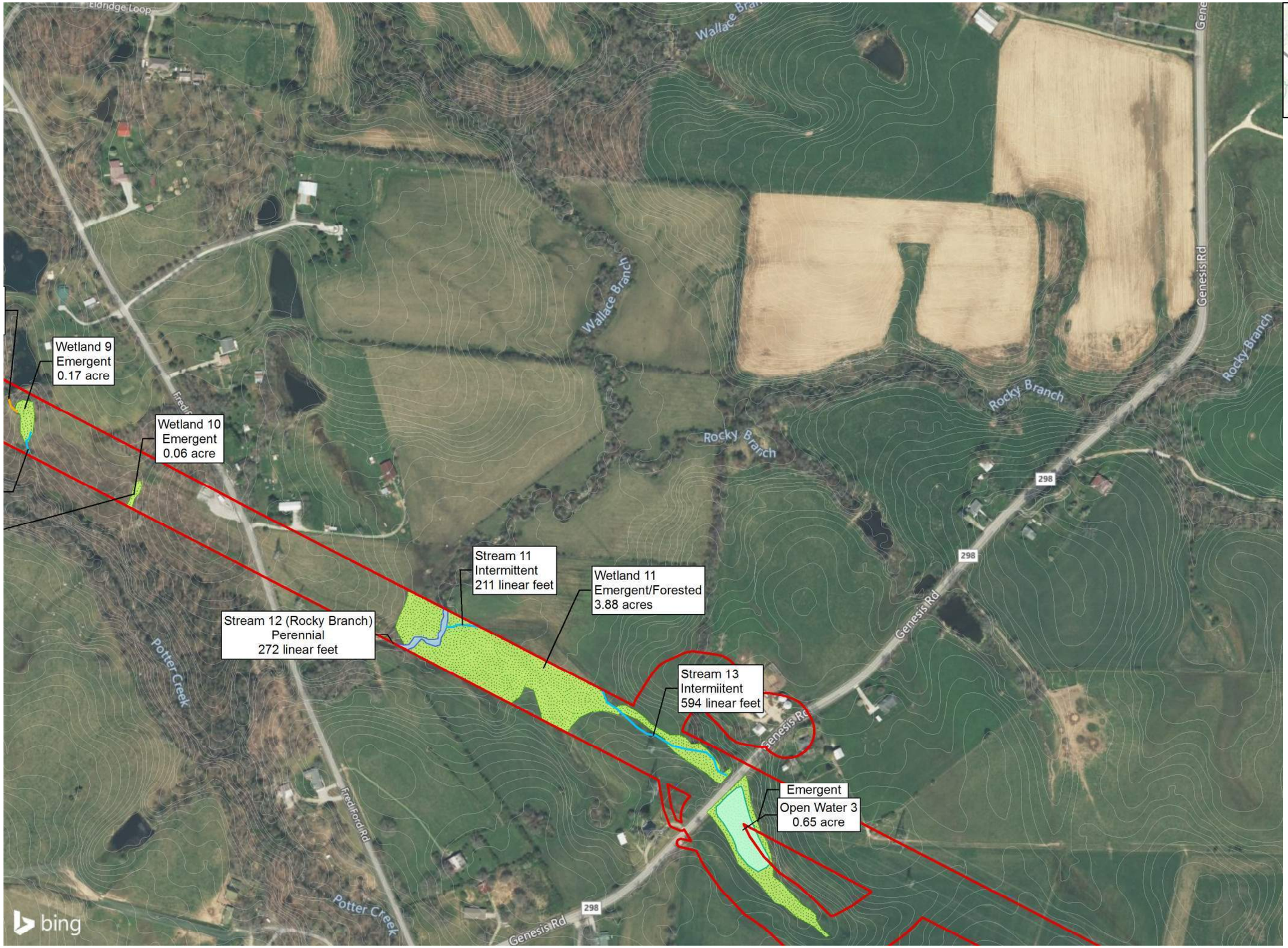

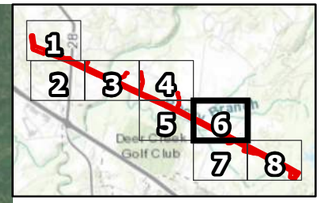

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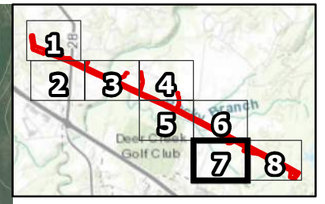

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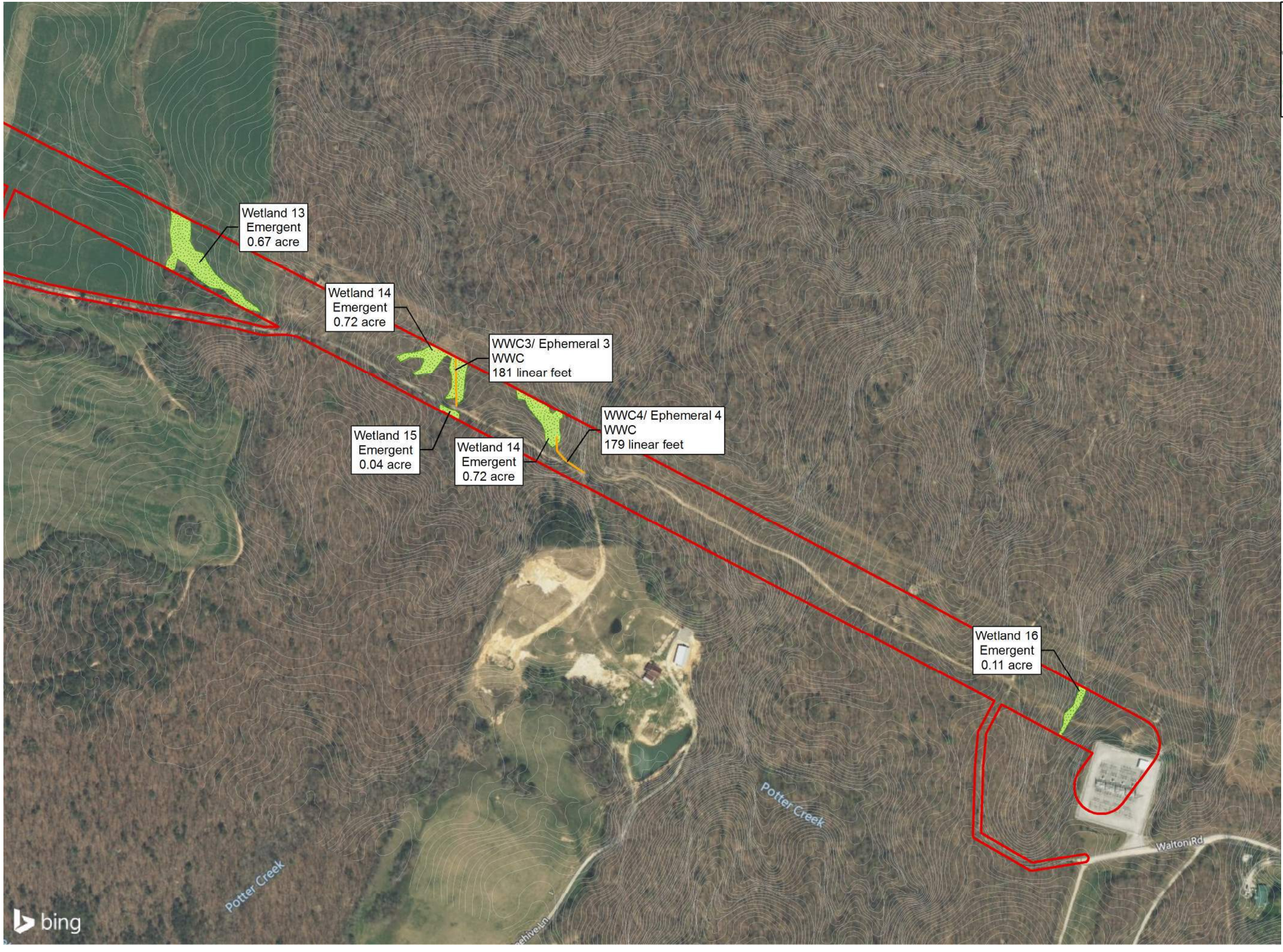

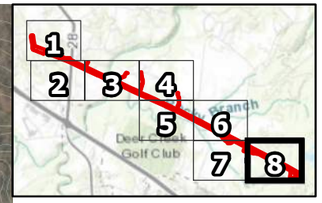

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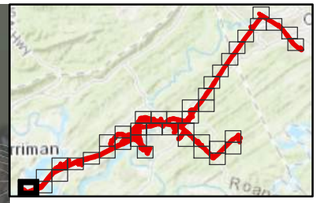
0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery



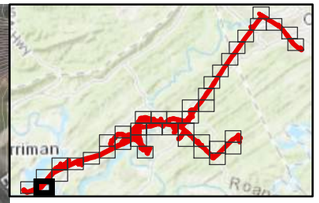
KIINGSTON TRANSMISSION LINE - EAST

LEGEND

- Study Area
- Culvert
- Delineated Perennial Stream
- Delineated Intermittent Streams
- Wet Weather Conveyance
- Delineated Perennial Stream
- Wet Weather Conveyance
- HDR Delineated Open Water
- HDR Delineated Wetland

0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery



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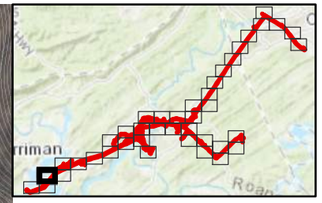

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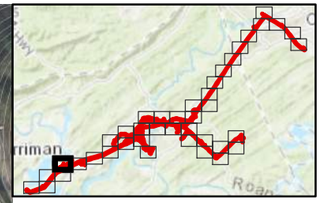

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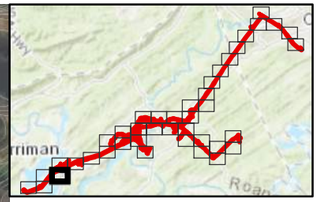

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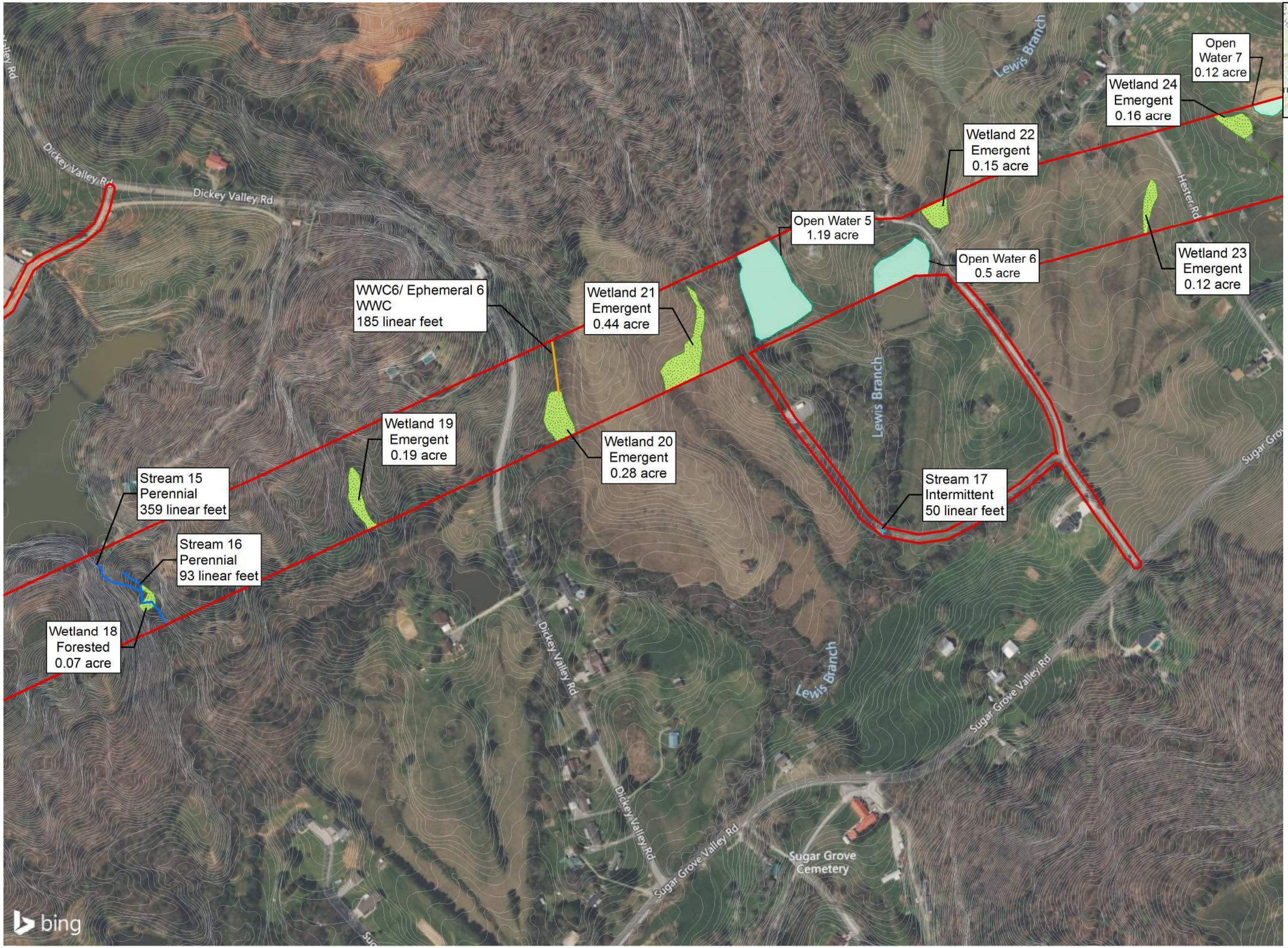

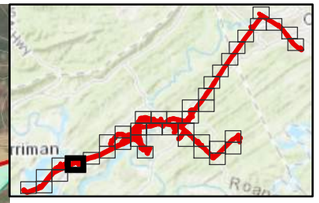

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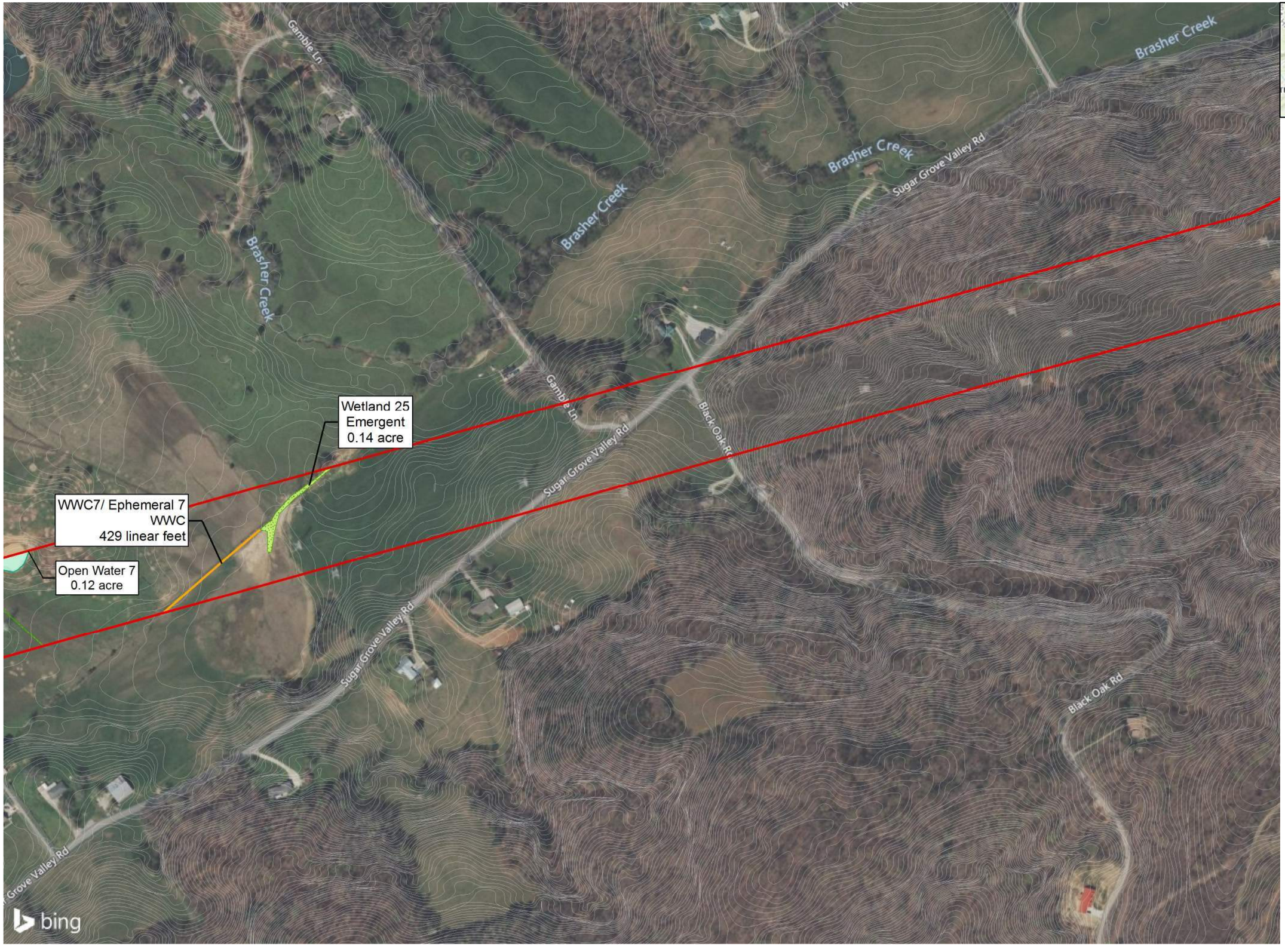

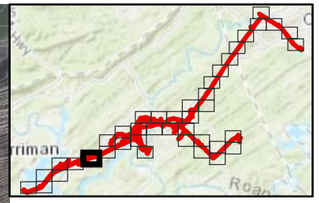

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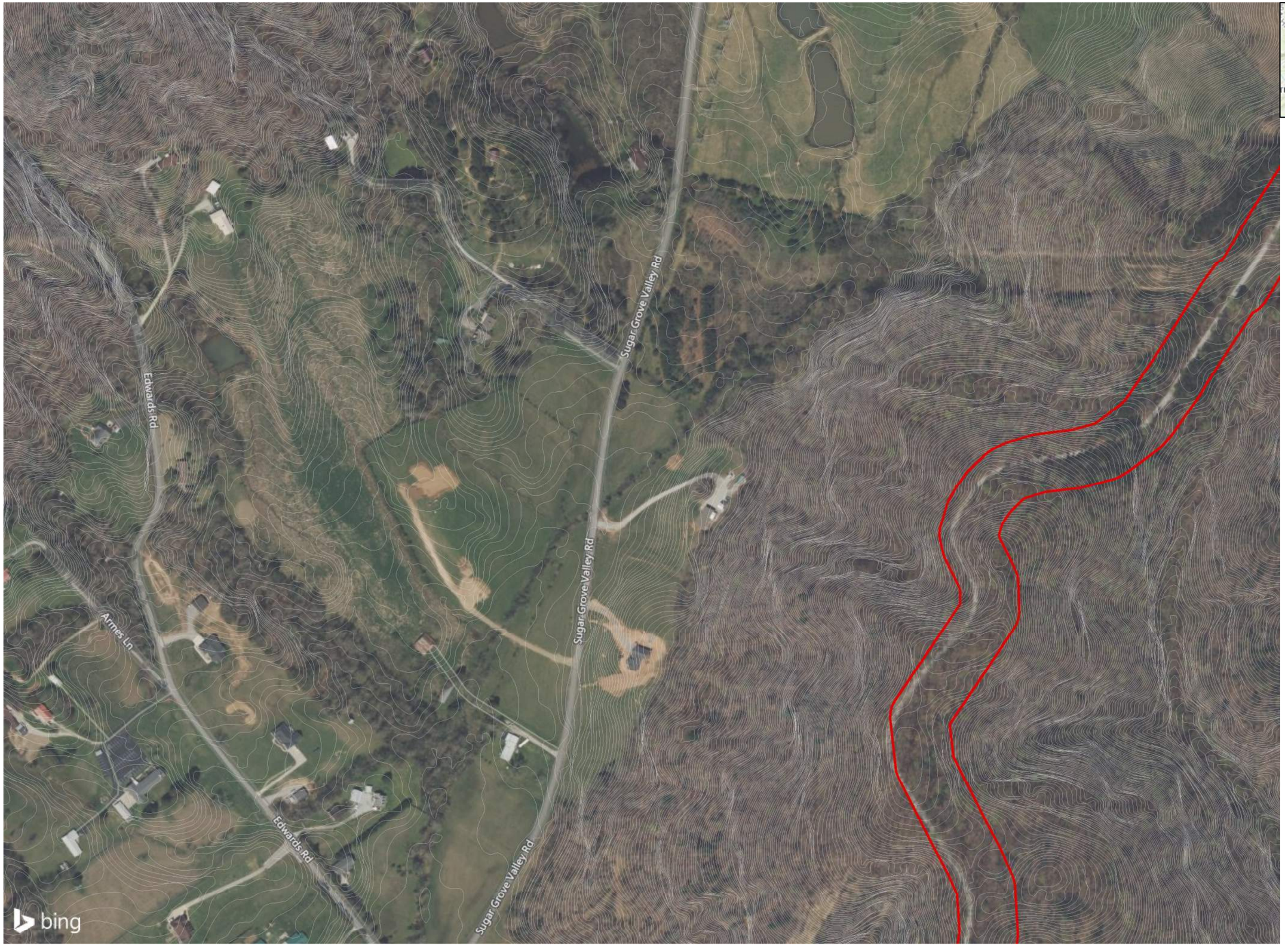

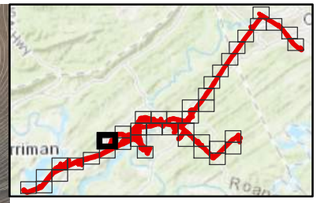

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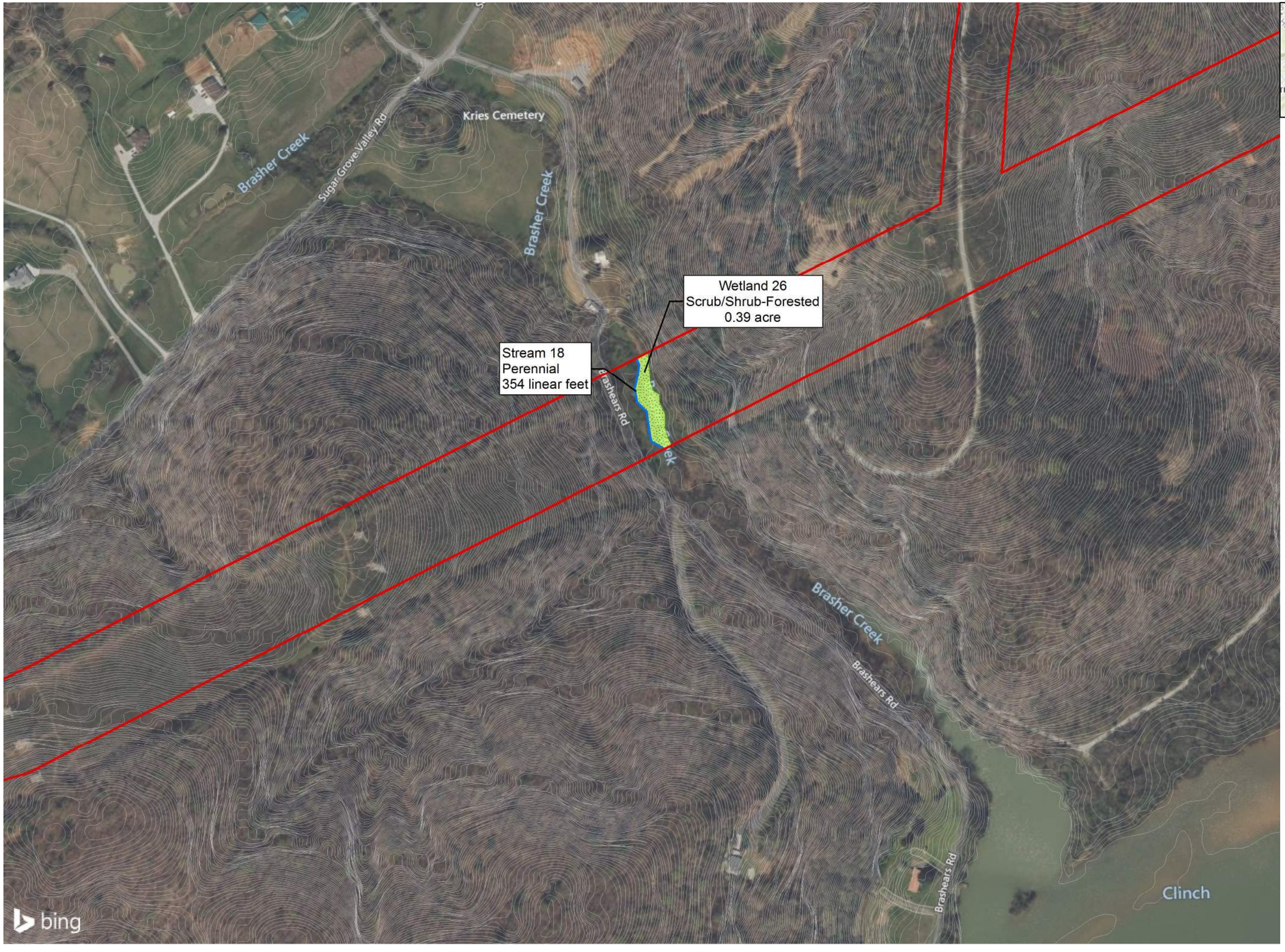

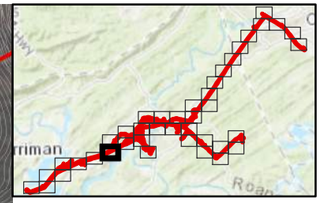

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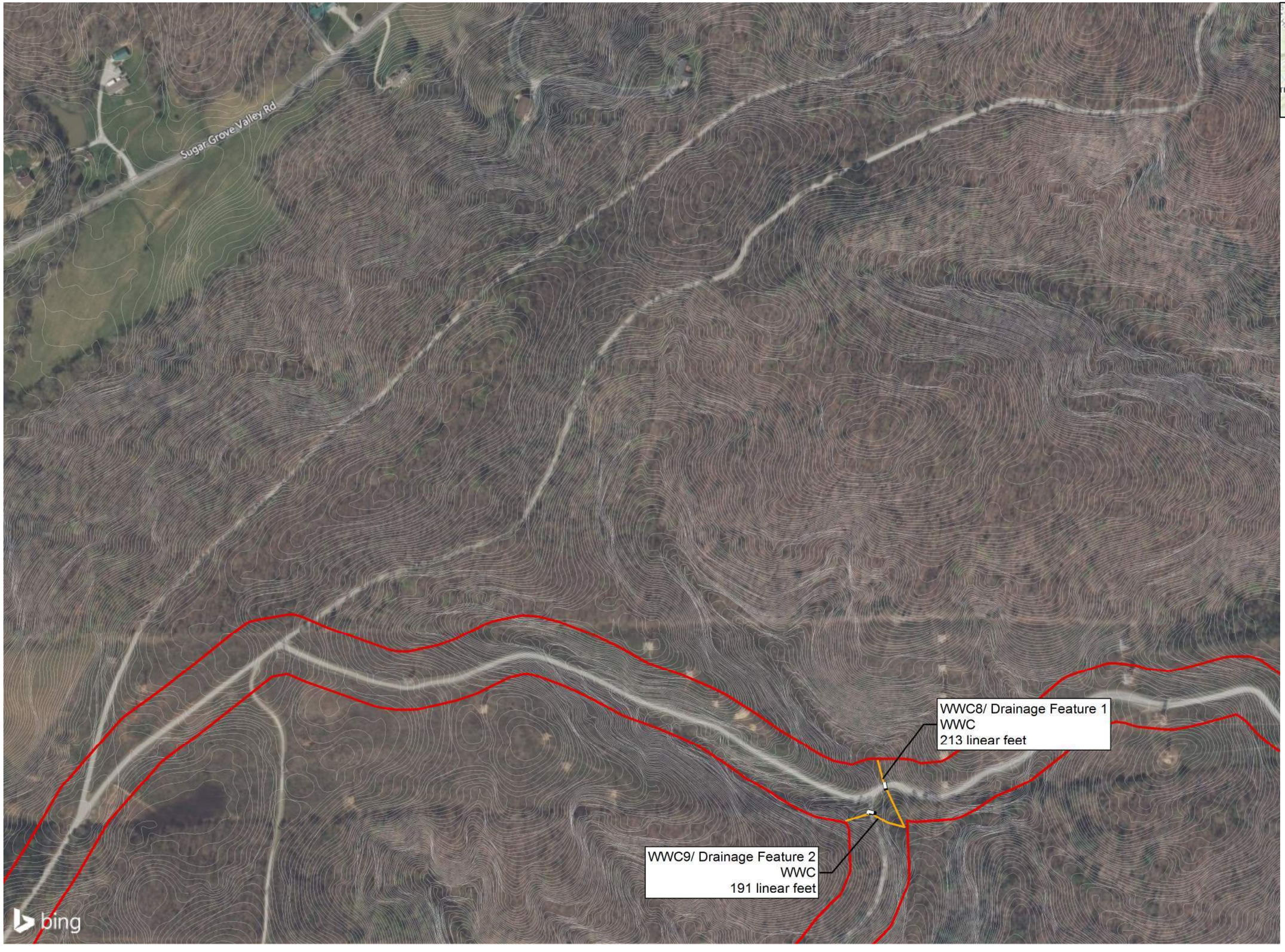

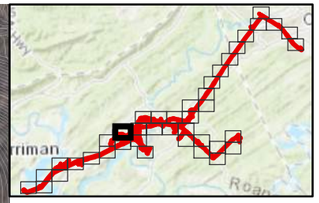

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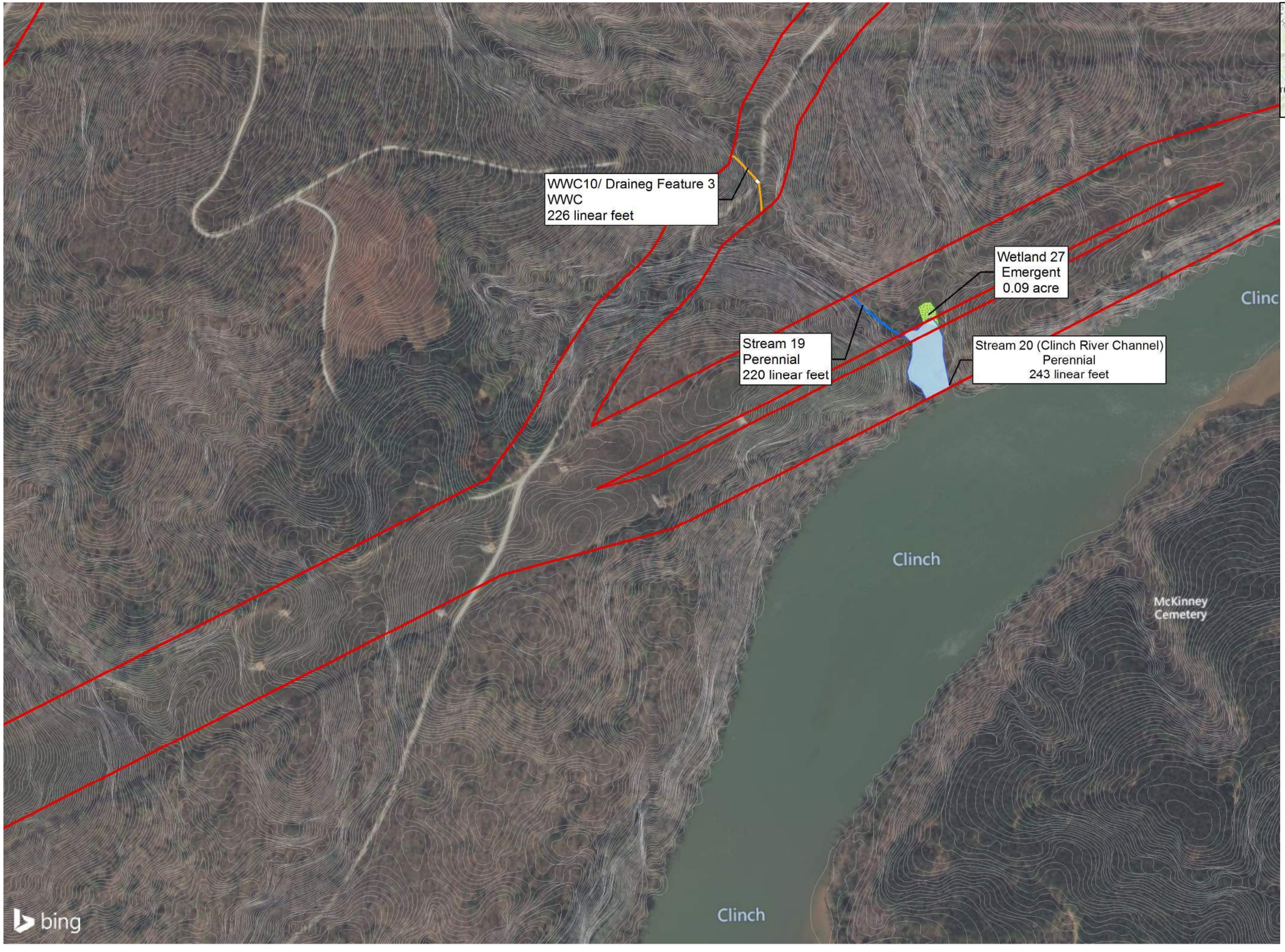

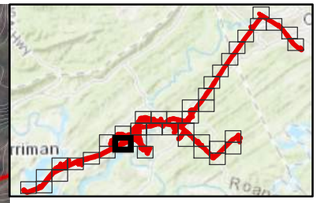

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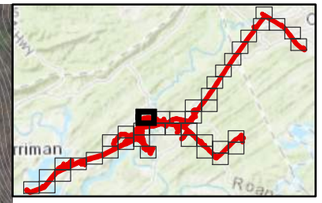

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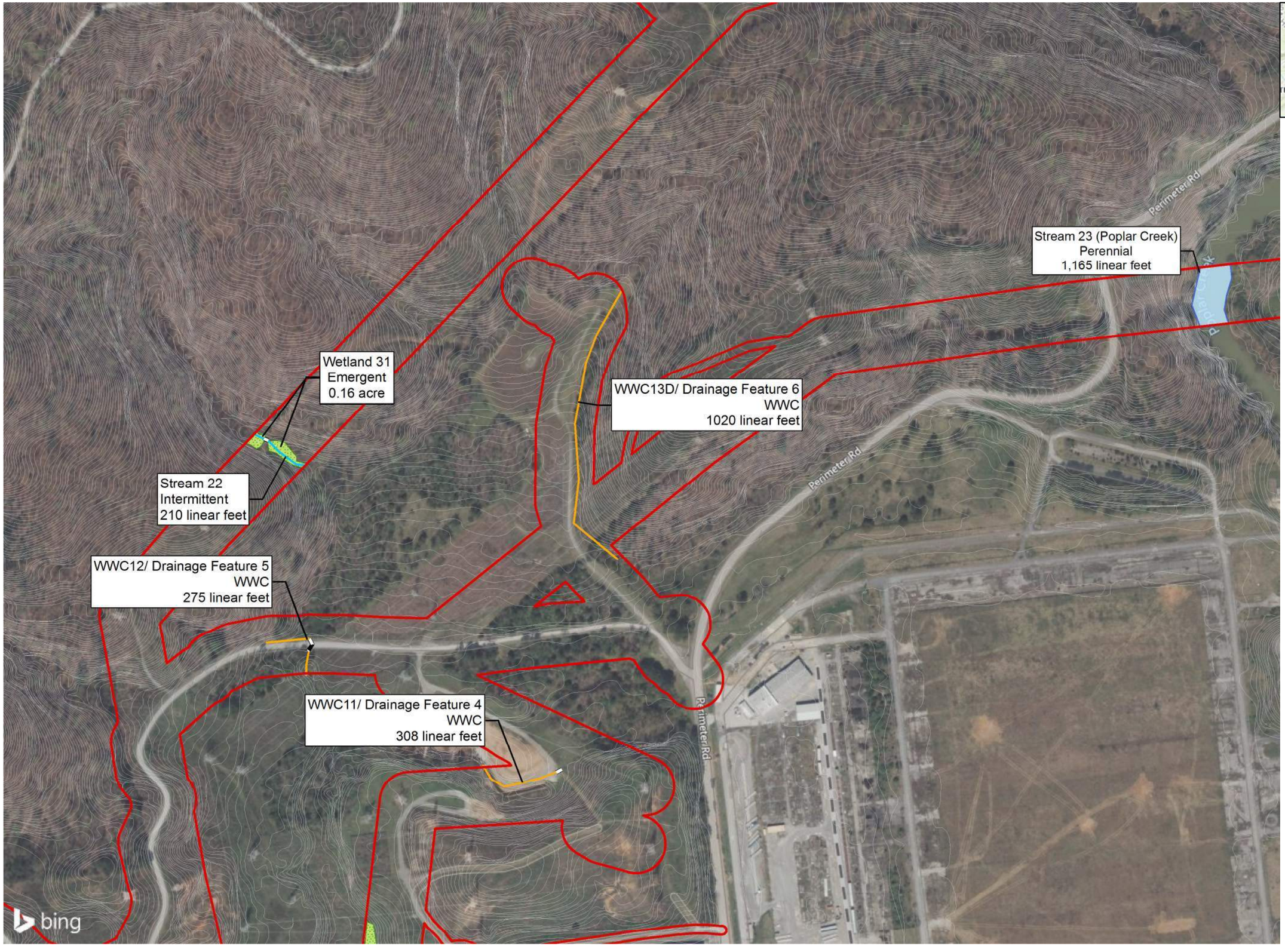

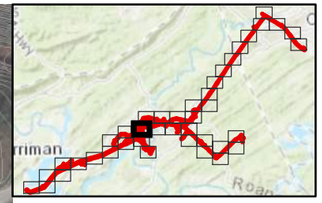

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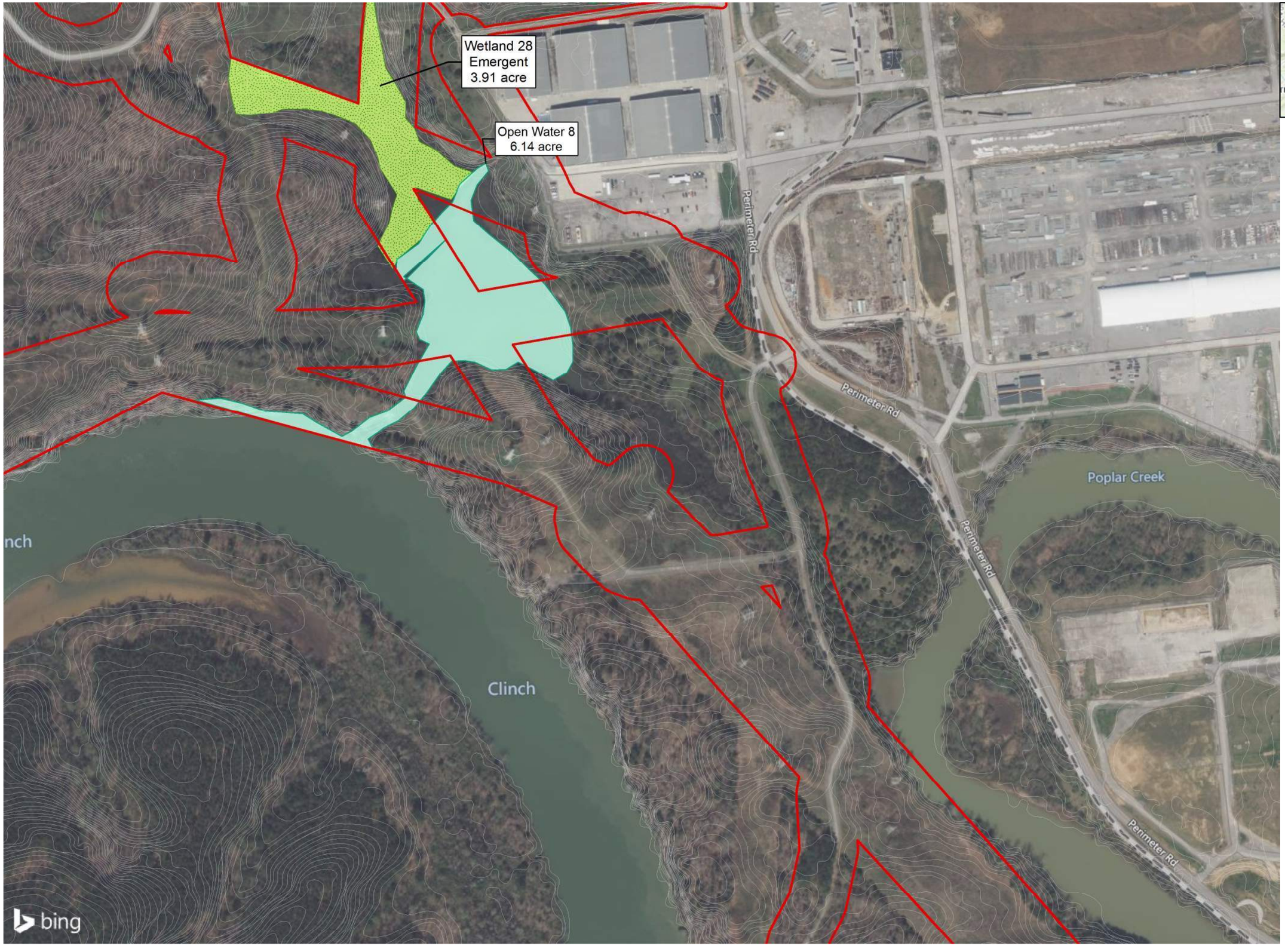

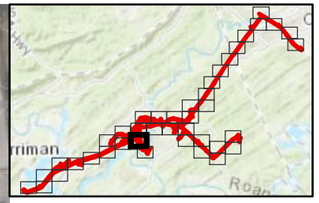

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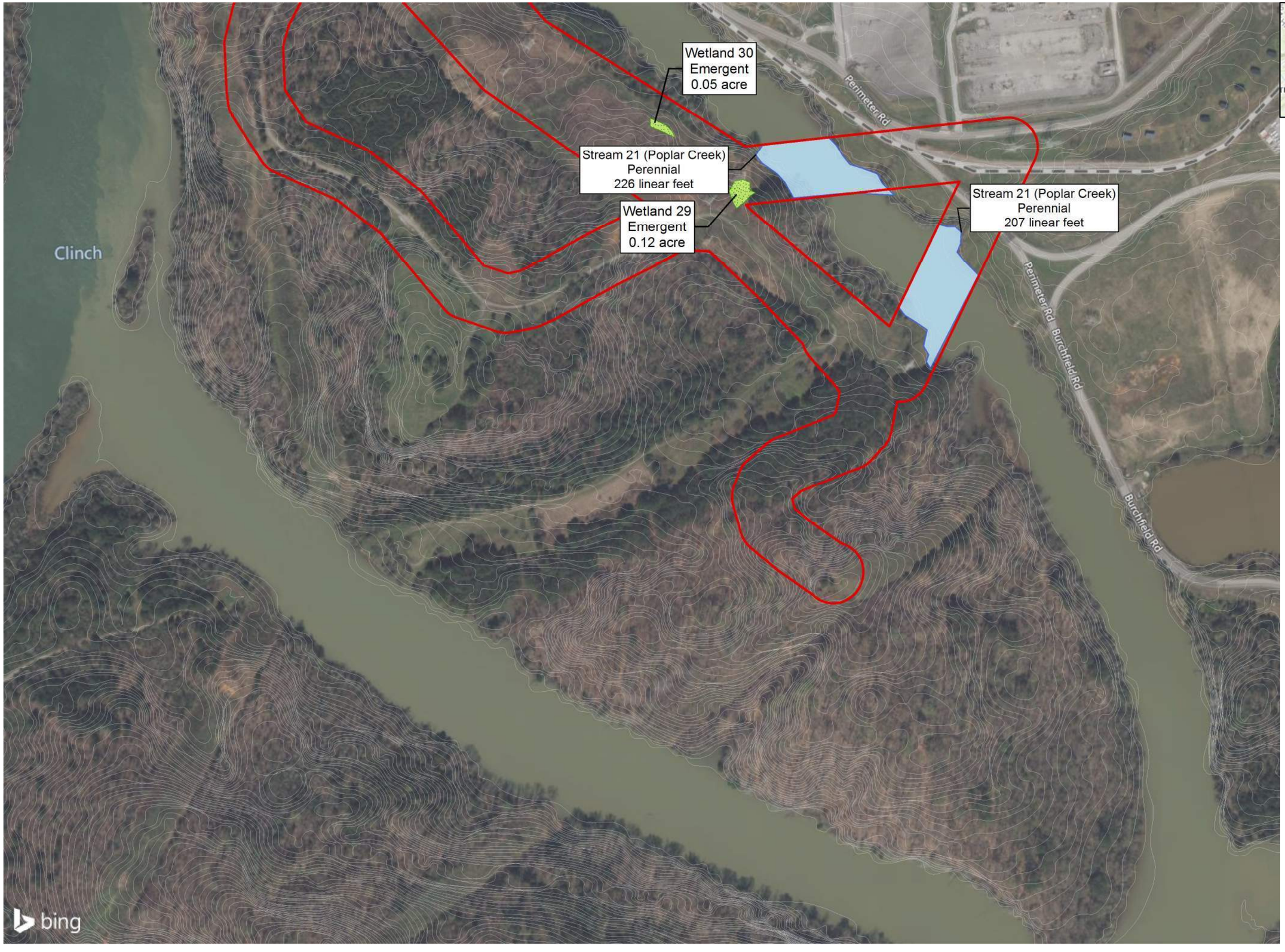

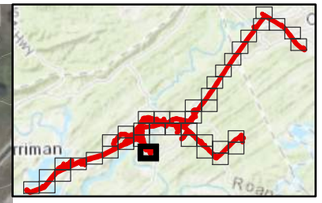

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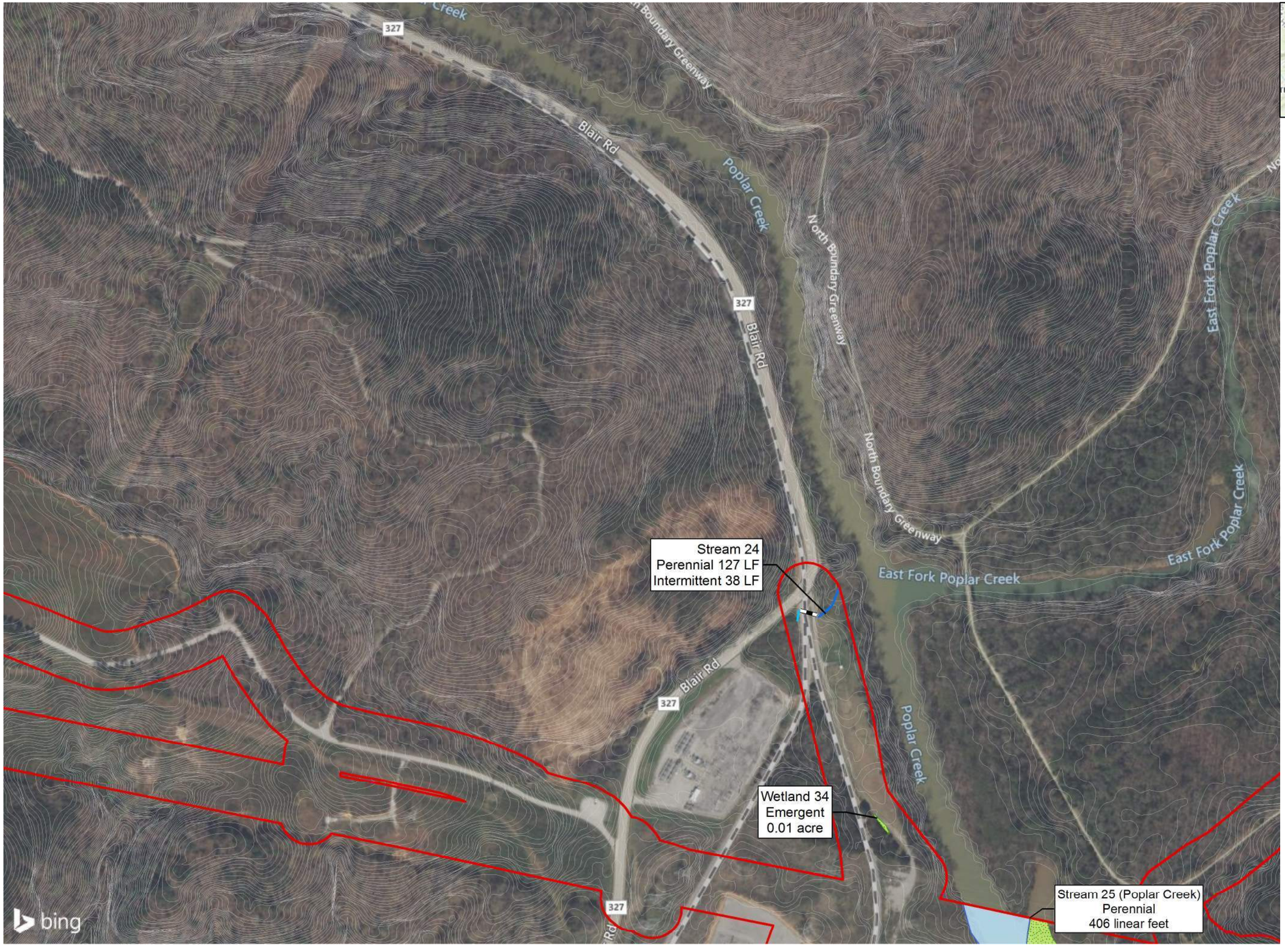

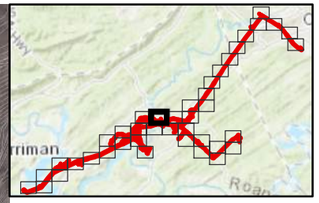

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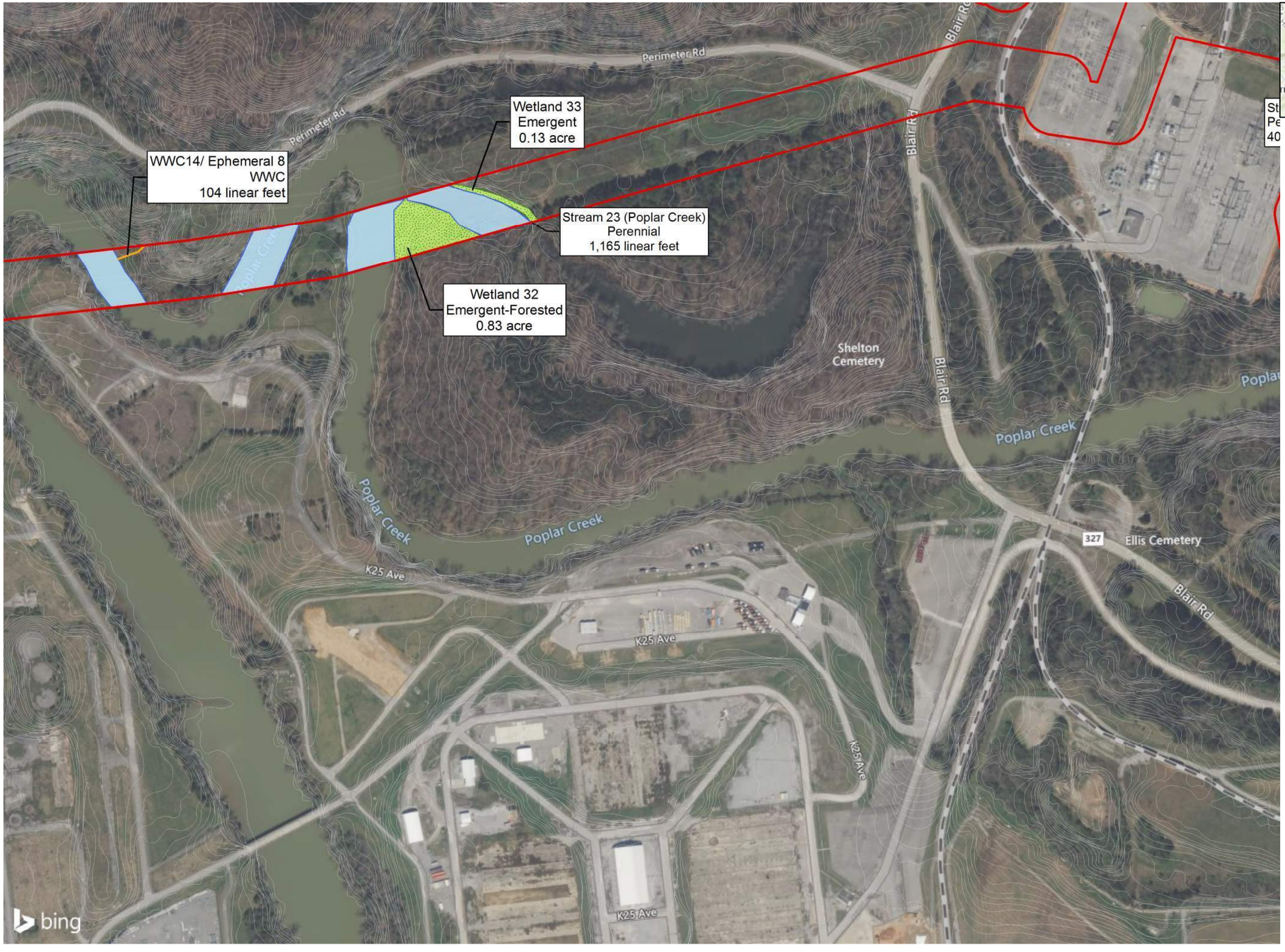

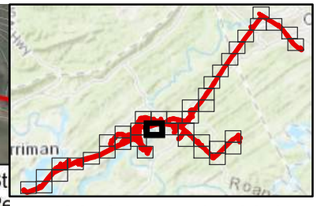

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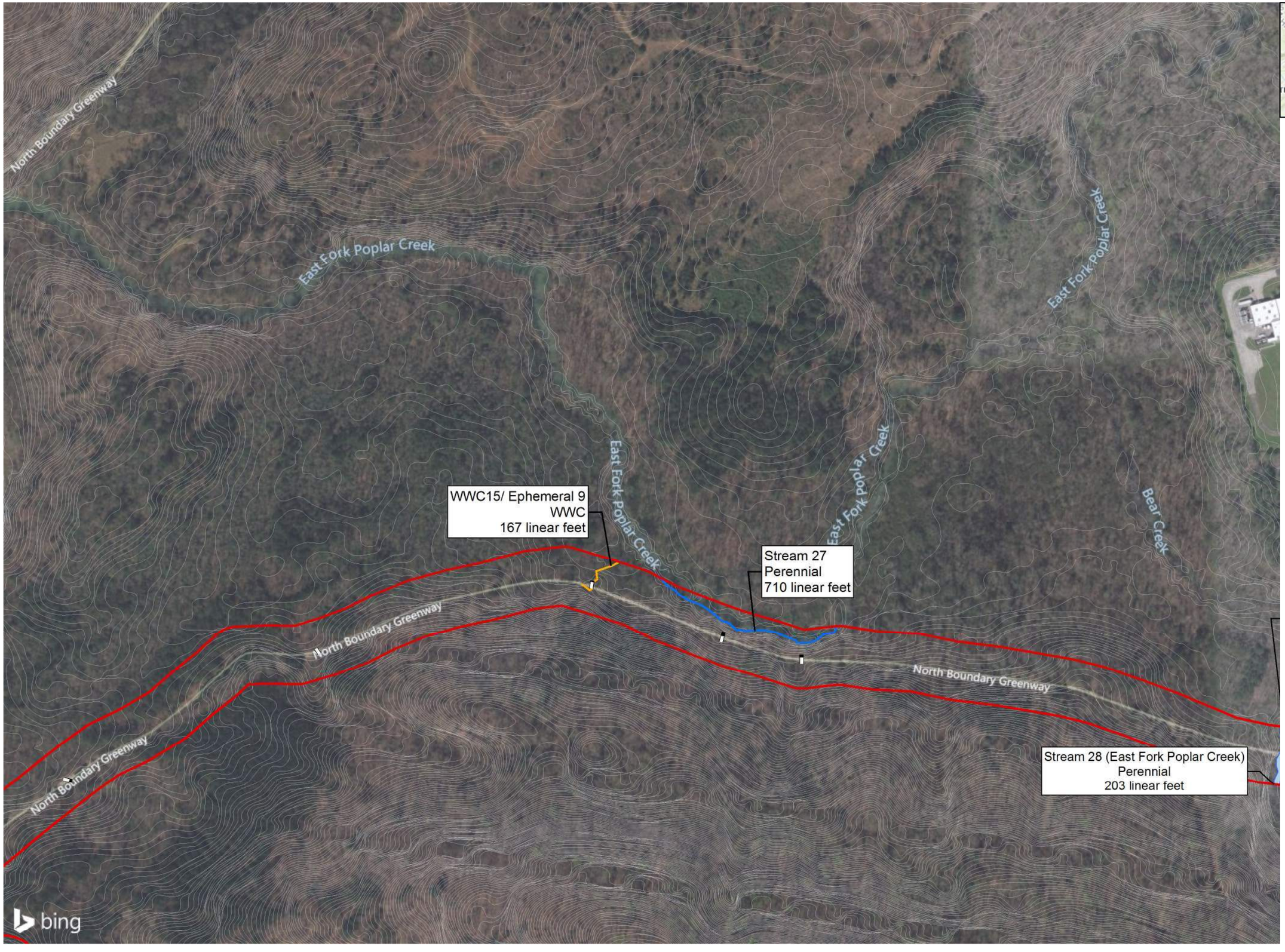

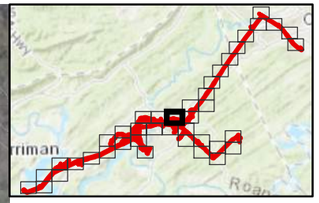

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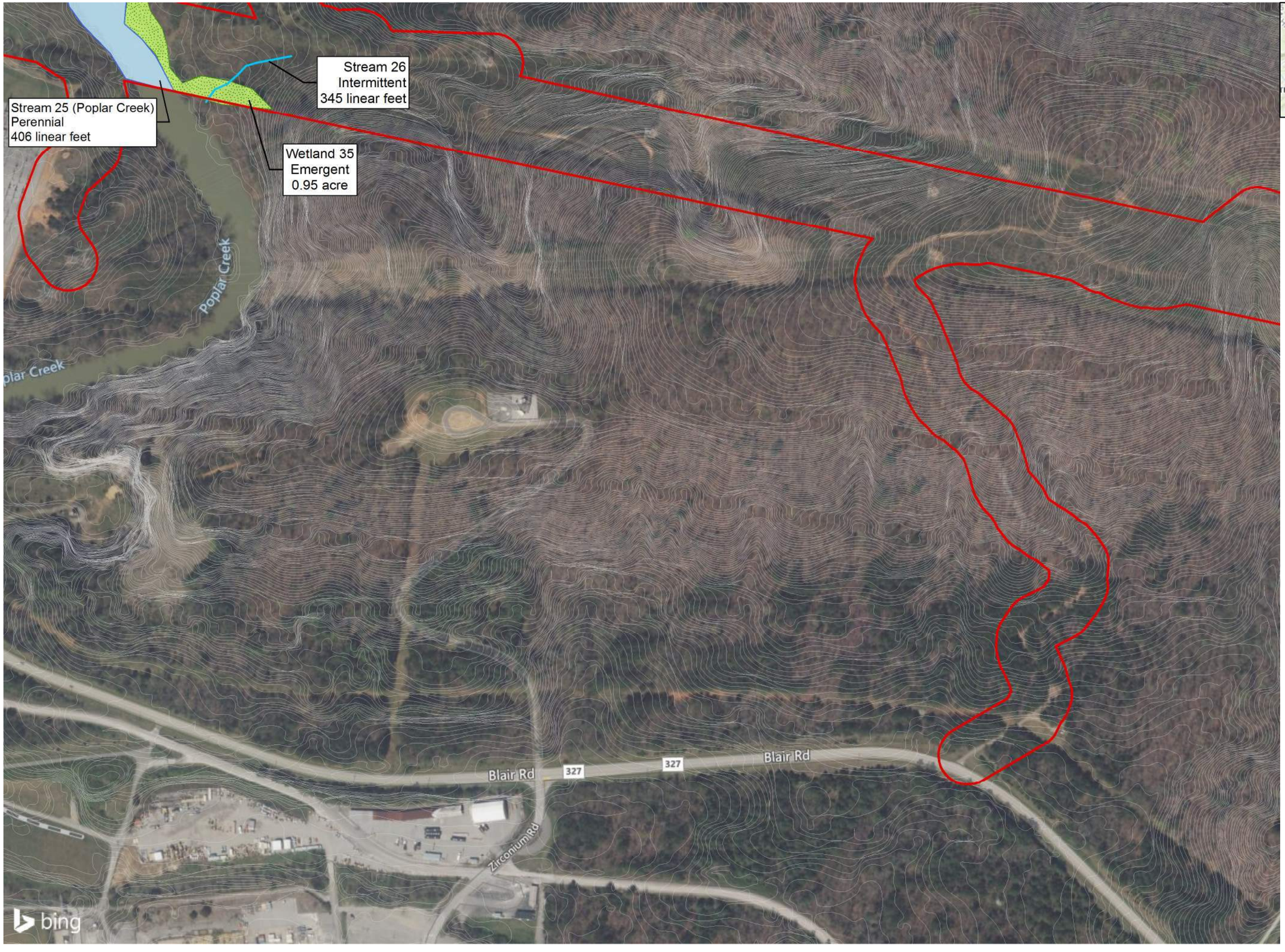

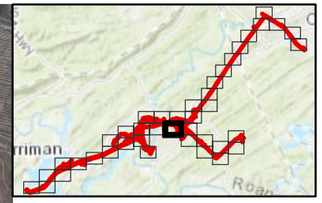

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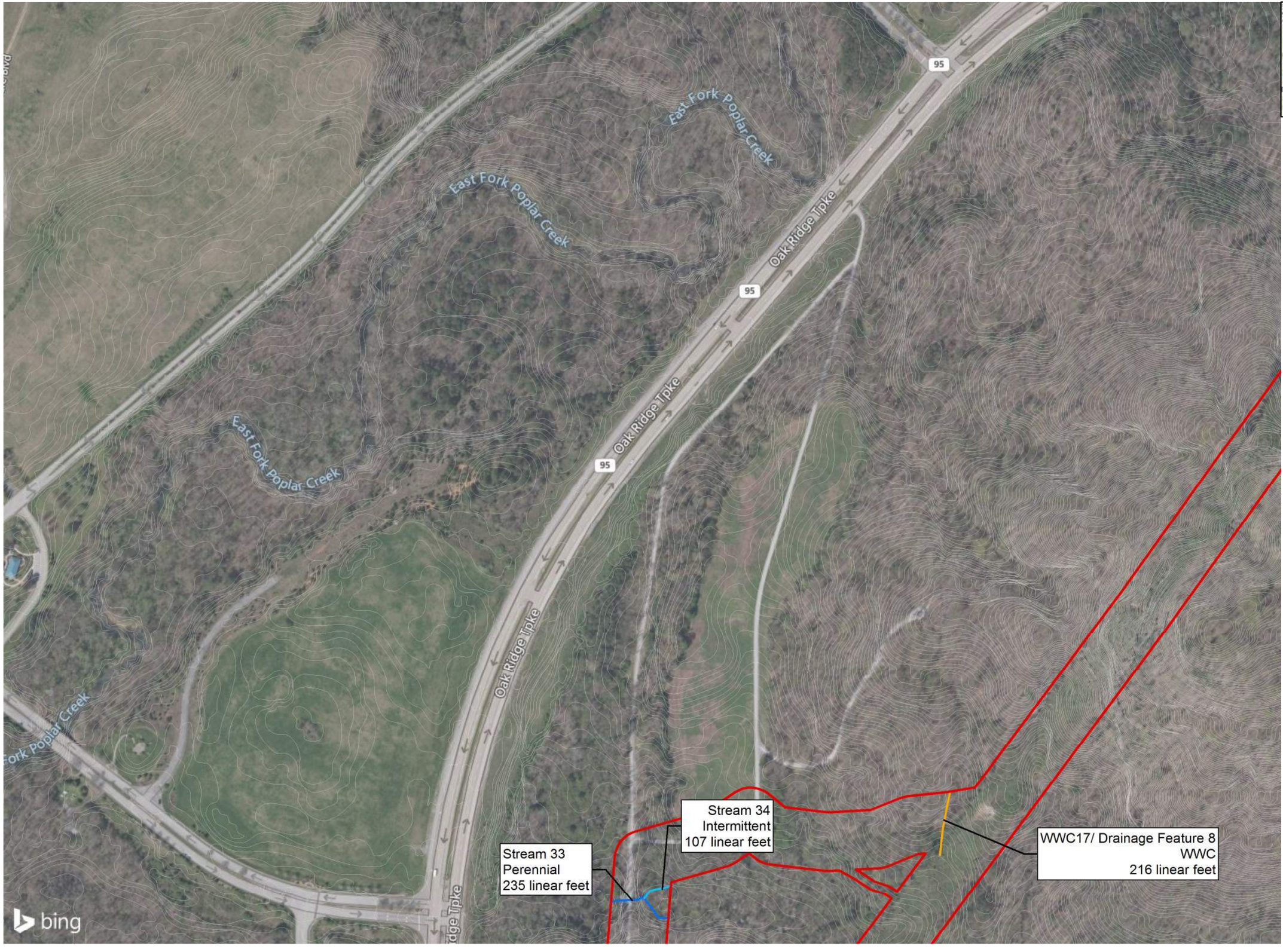

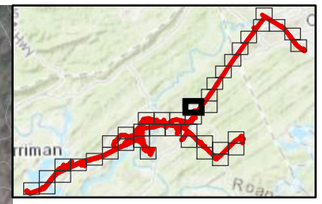

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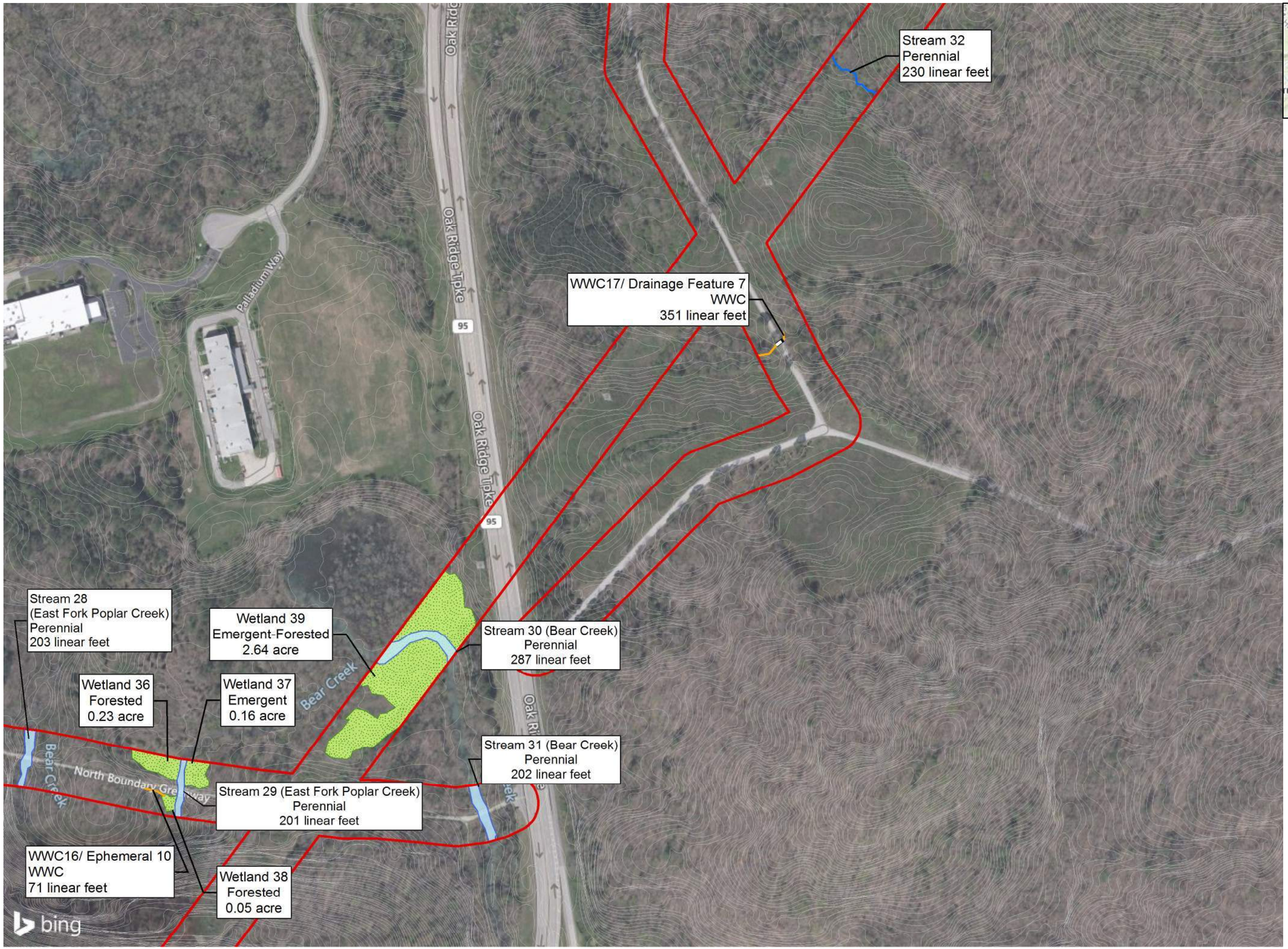

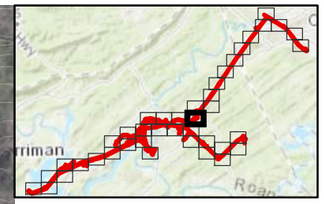

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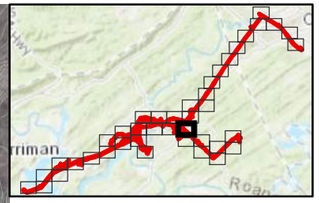

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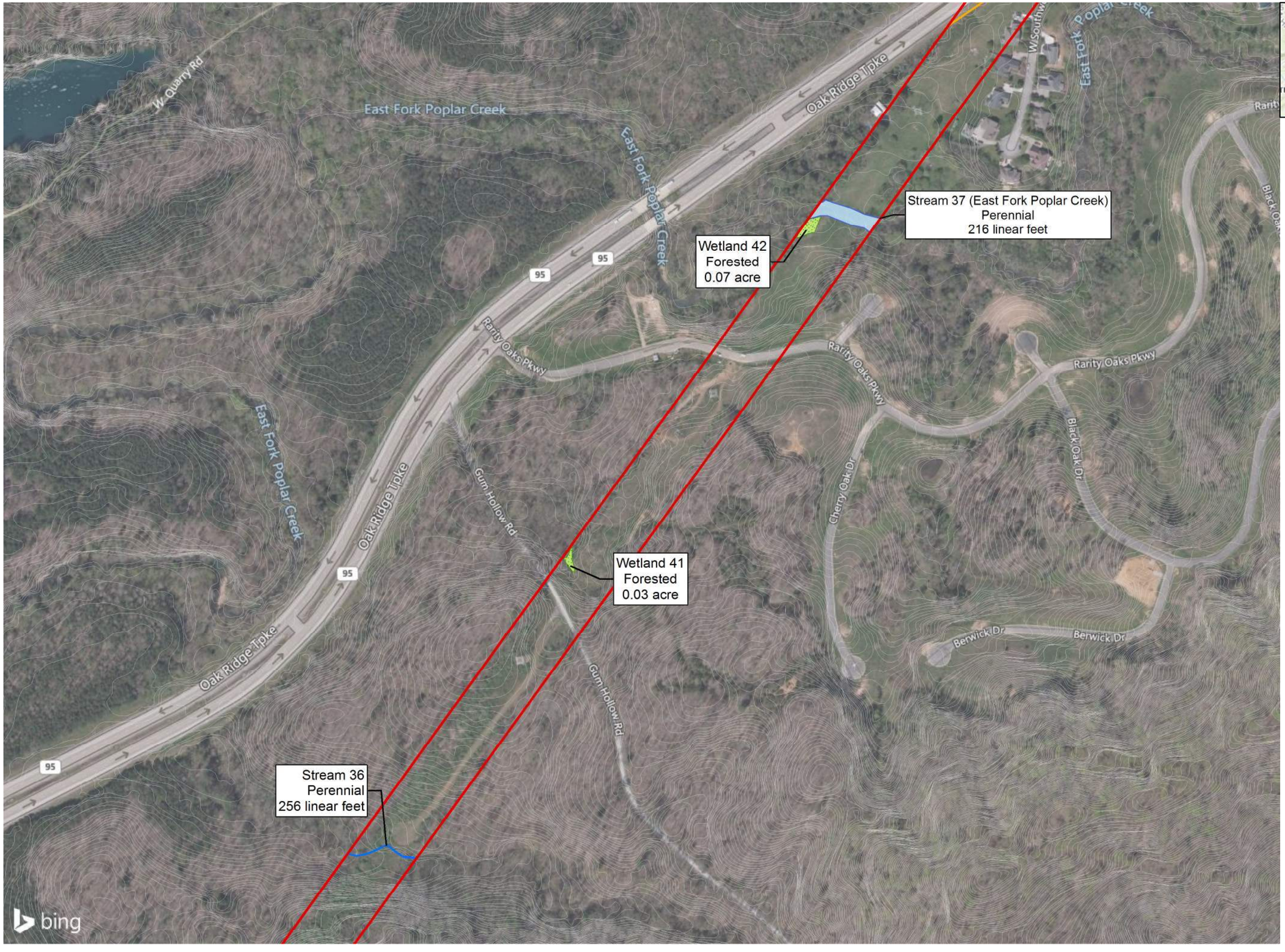

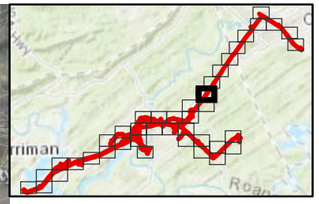

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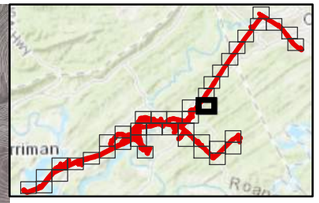
0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery



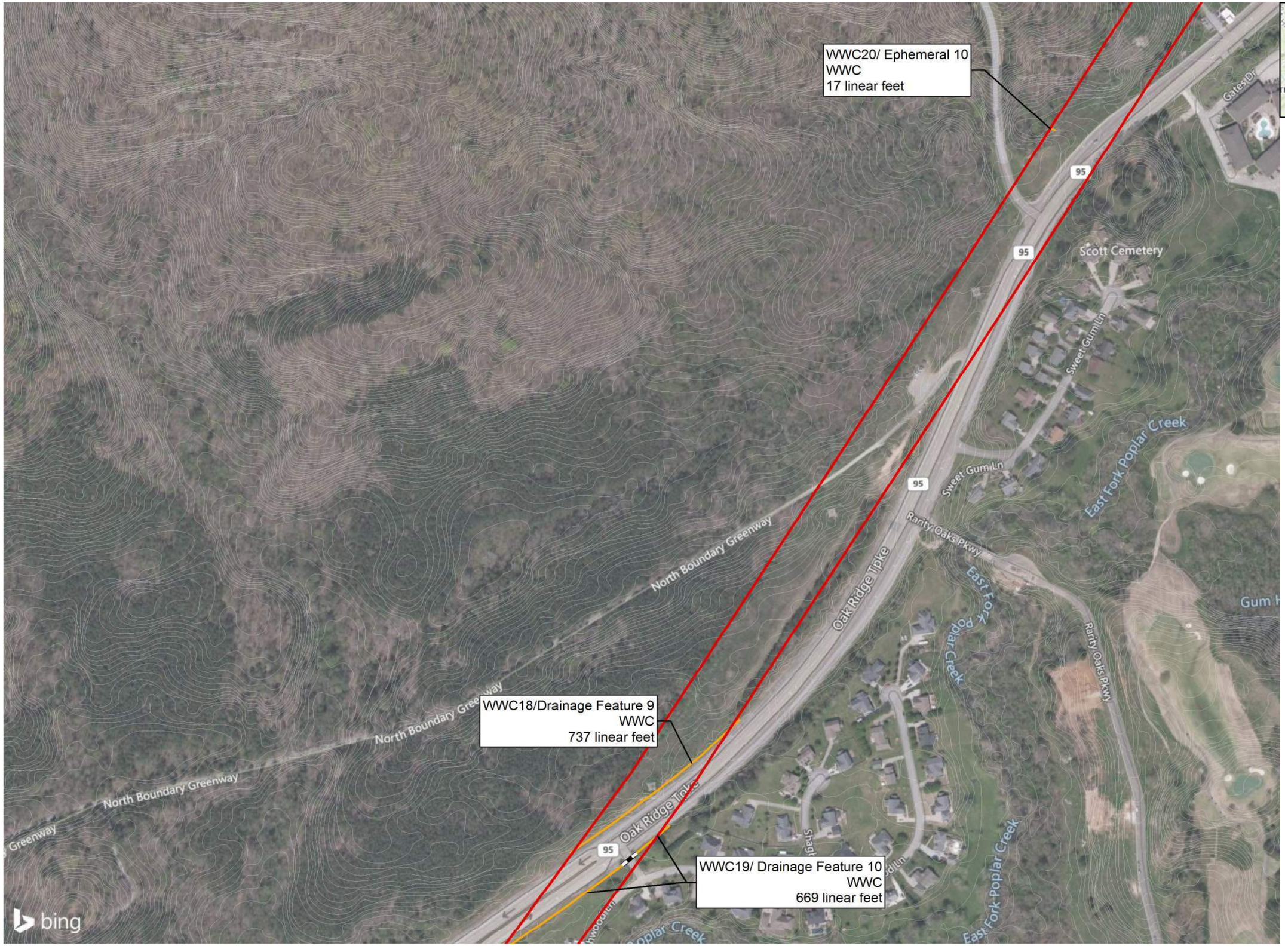
KIINGSTON TRANSMISSION LINE - EAST

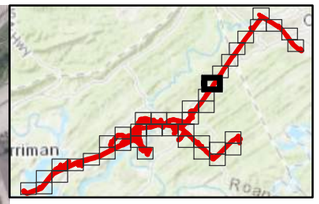
LEGEND

- Study Area
- Culvert
- Delineated Perennial Stream
- Delineated Intermittent Streams
- Wet Weather Conveyance
- Delineated Perennial Stream
- Wet Weather Conveyance
- HDR Delineated Open Water
- HDR Delineated Wetland

0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery





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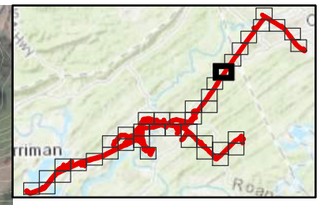

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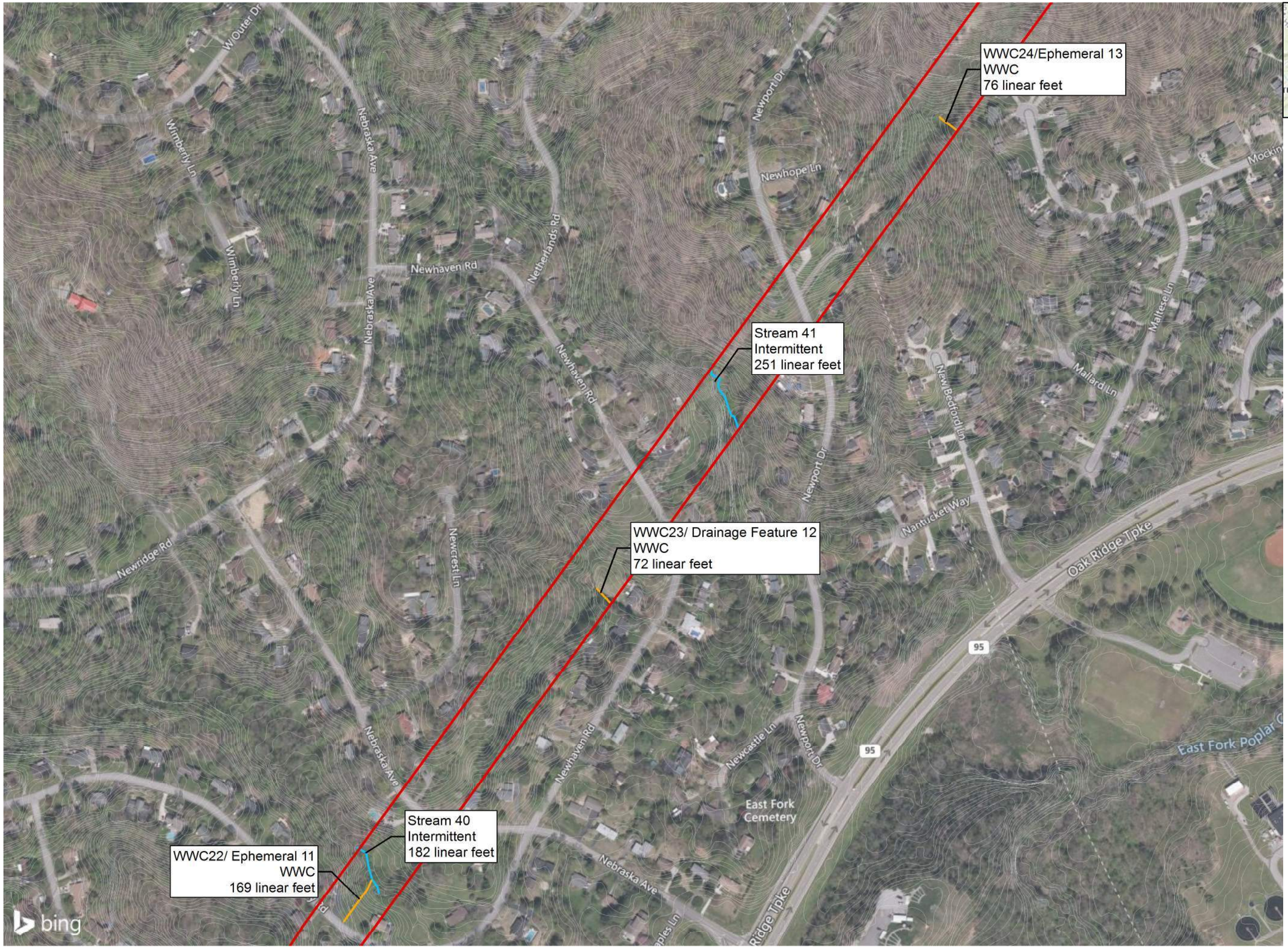

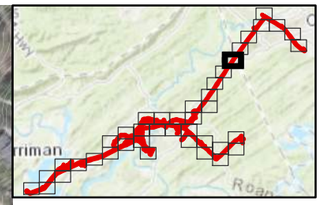

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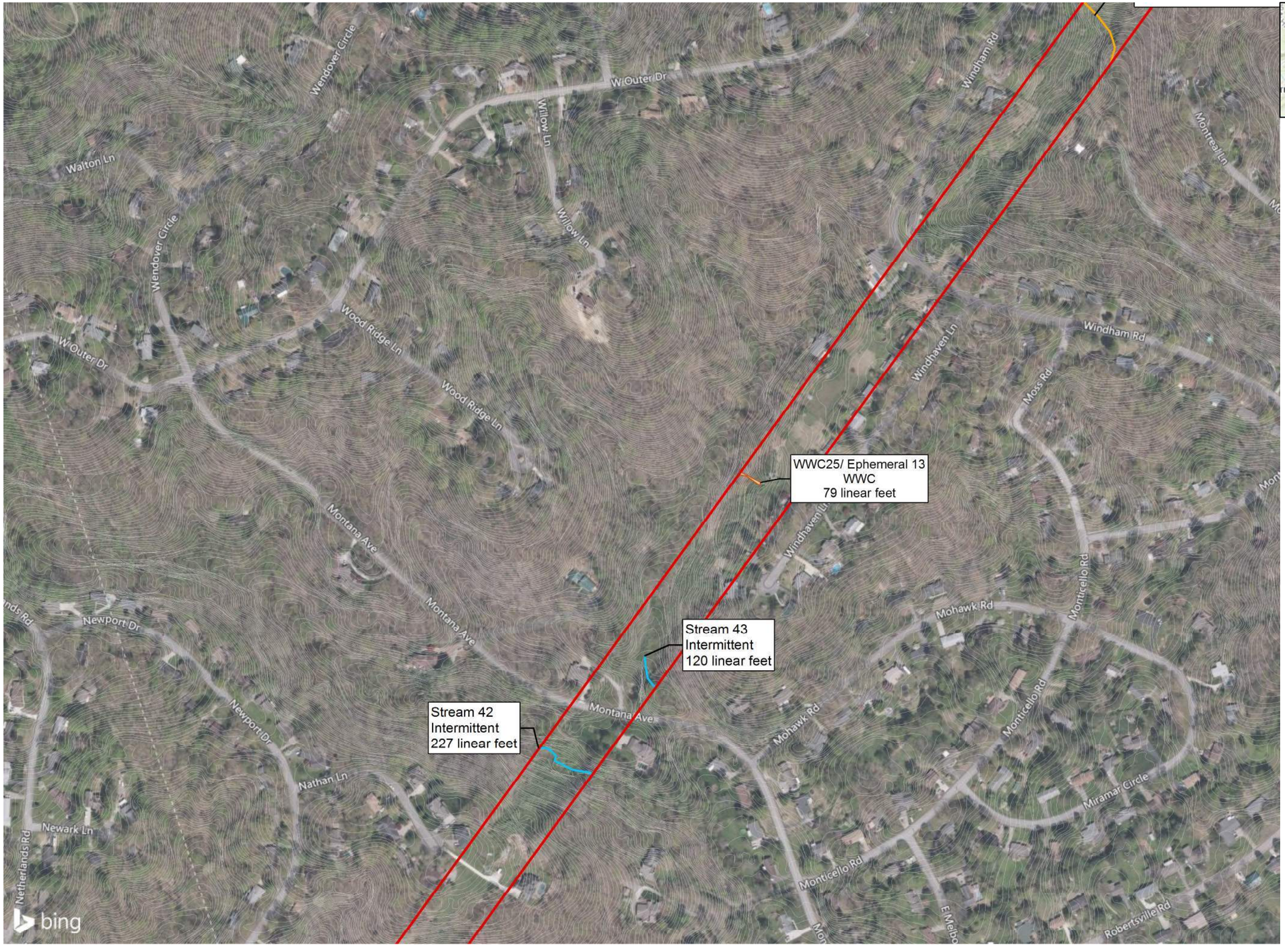

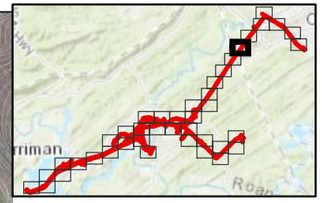

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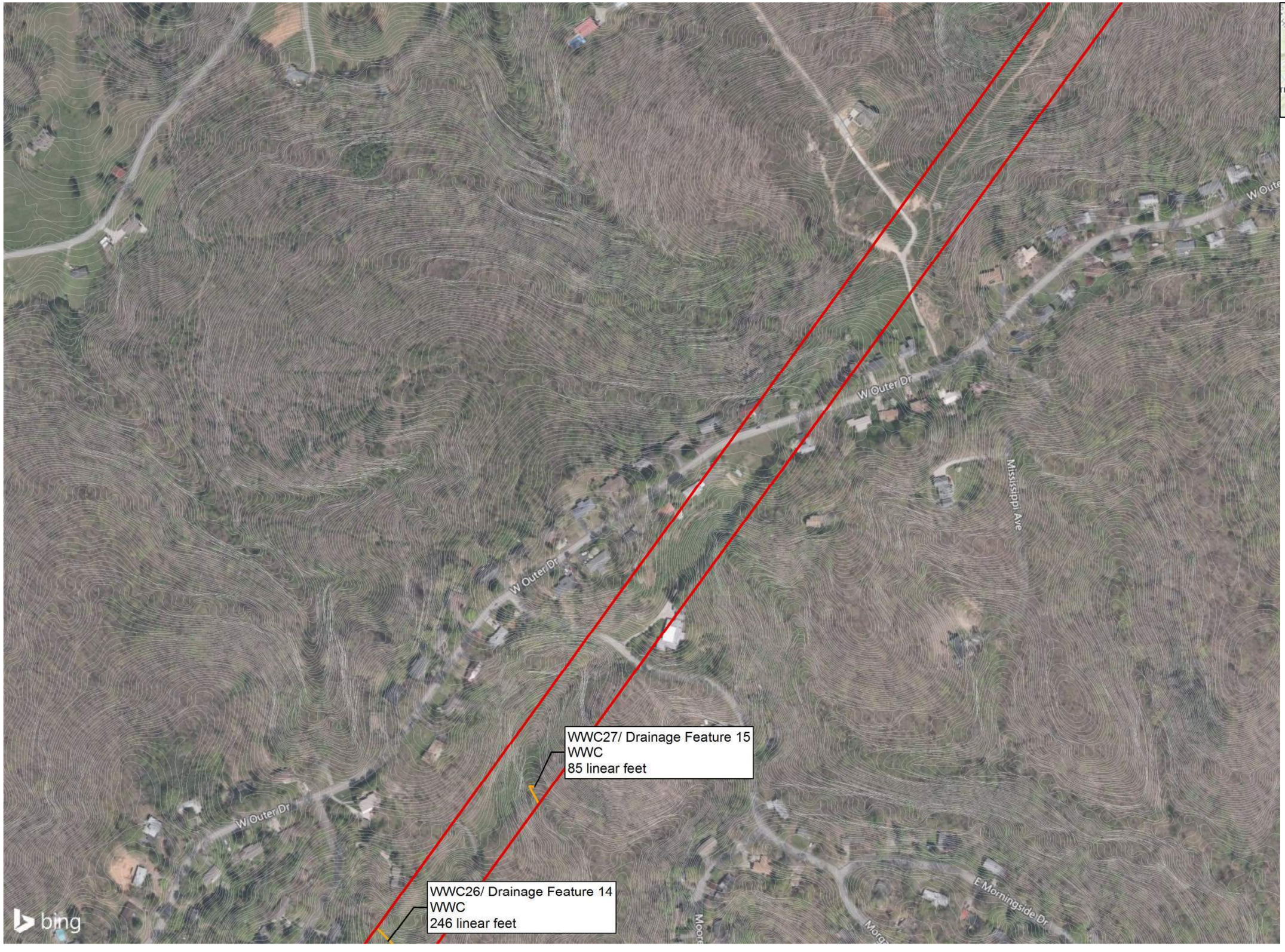

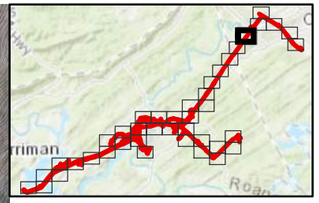

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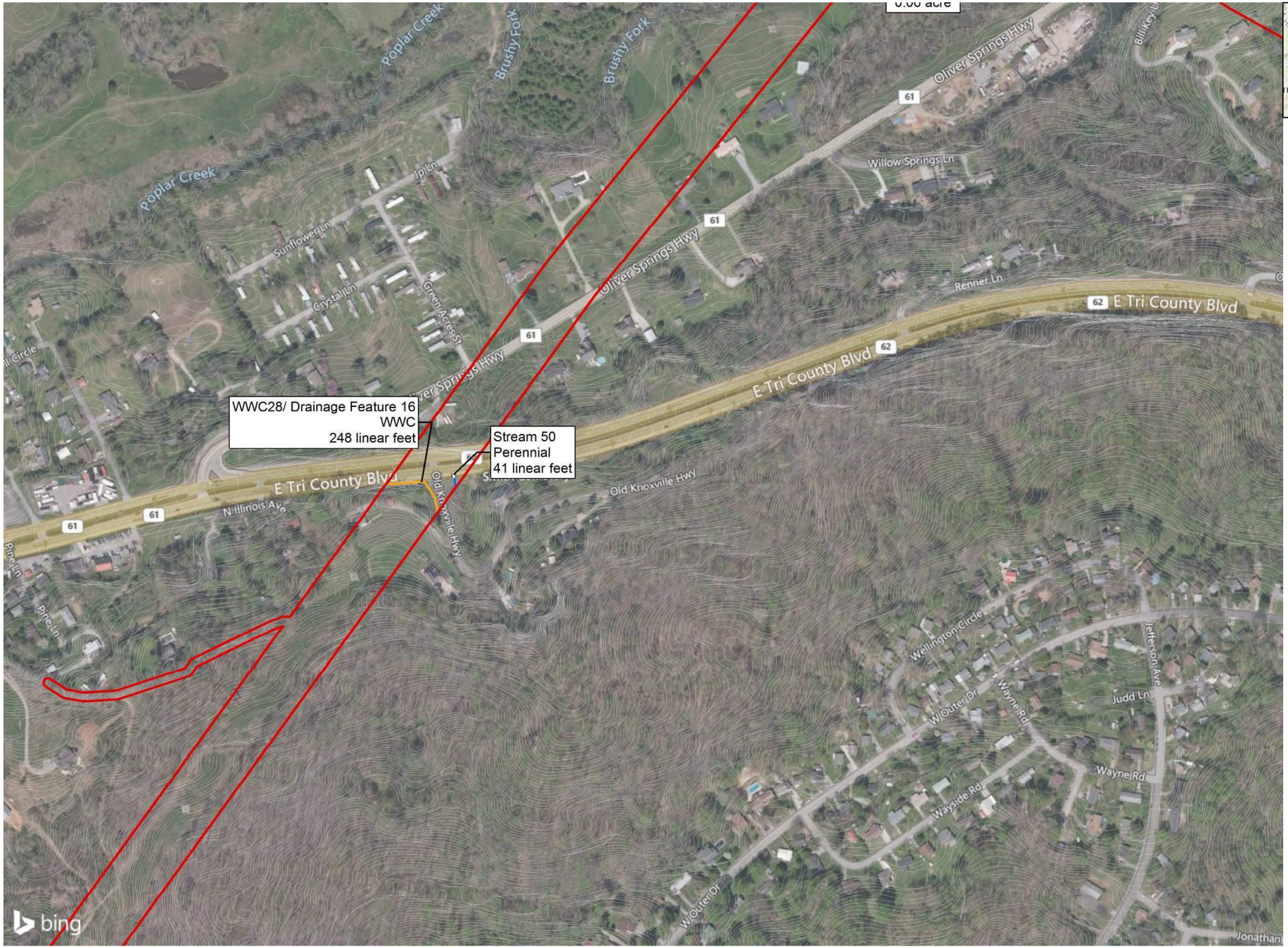

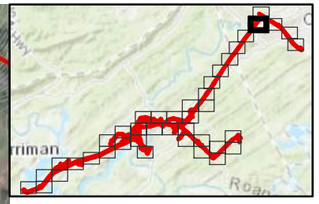

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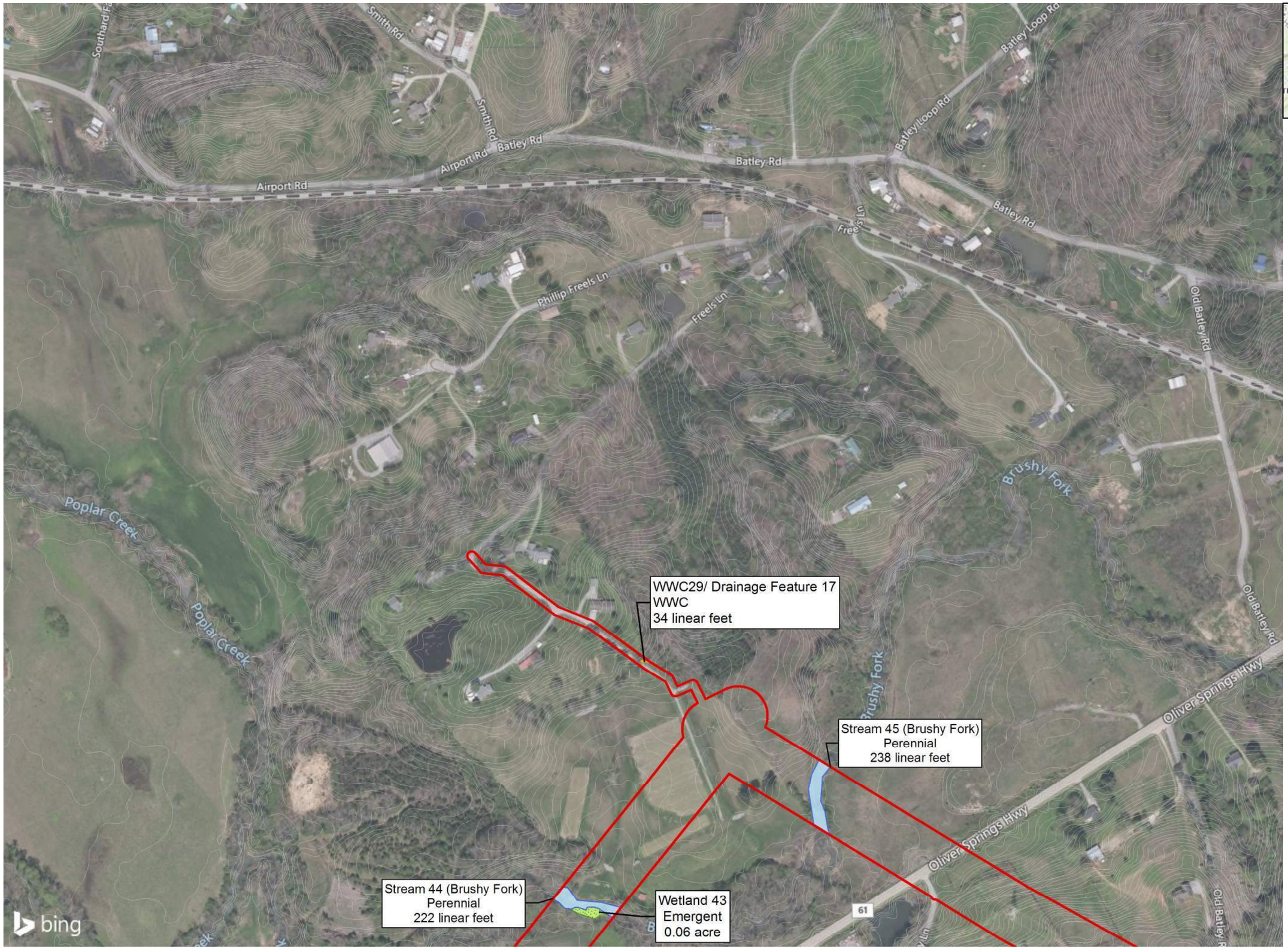

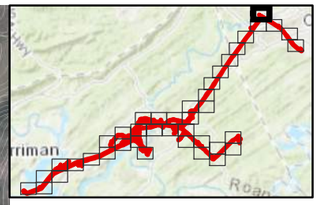

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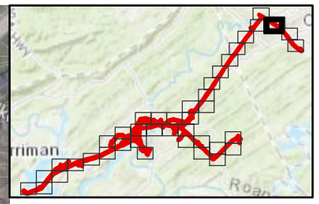
0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery

Stream 46
Perennial
213 linear feet

WWC30/ Ephemeral 14
WWC
527 linear feet

WWC31/Drainage Feature 18
WWC
161 linear feet



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0 Feet 300

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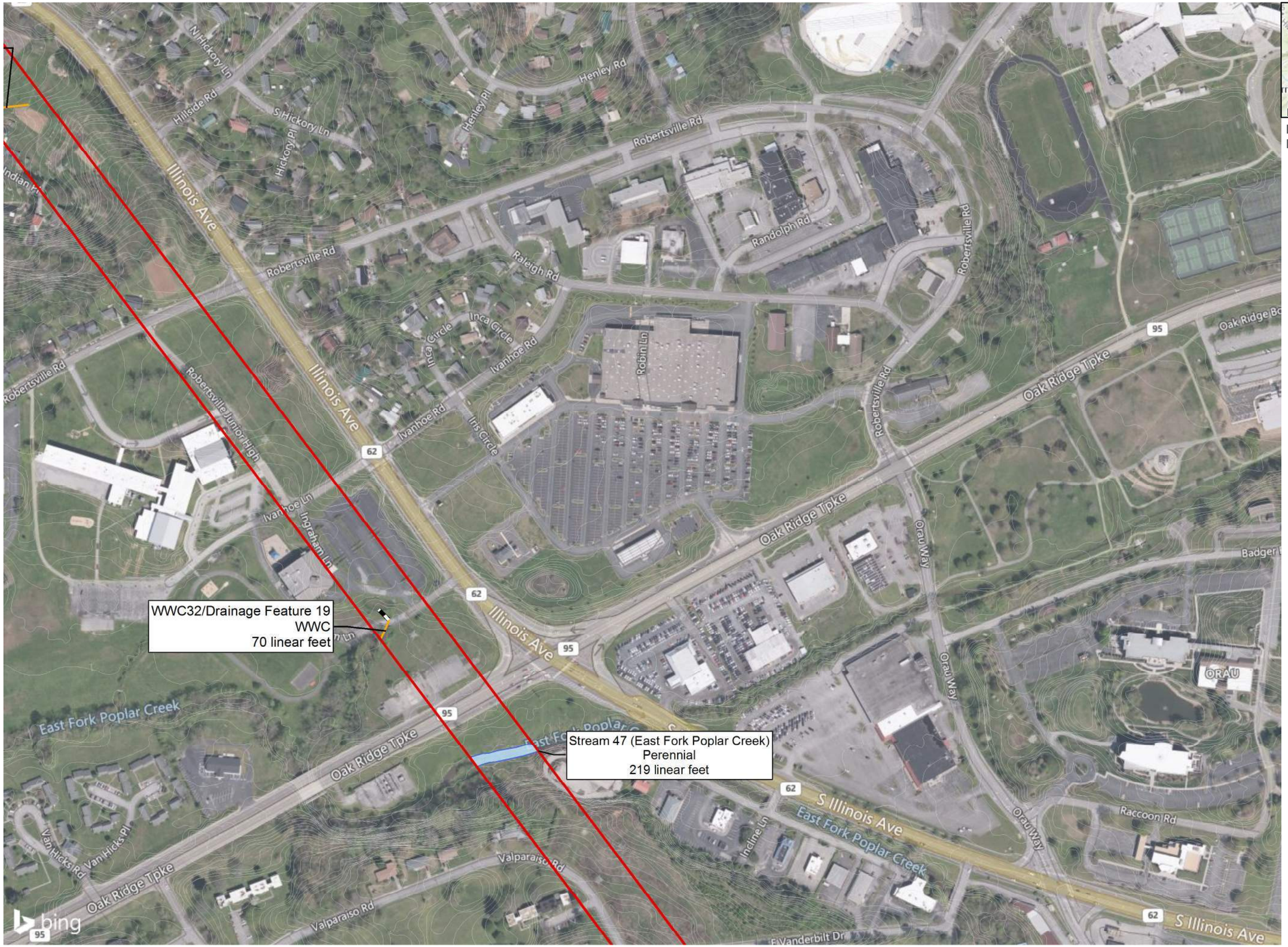

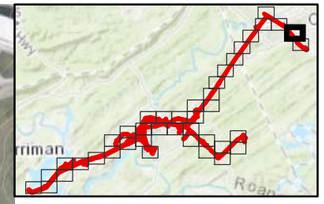

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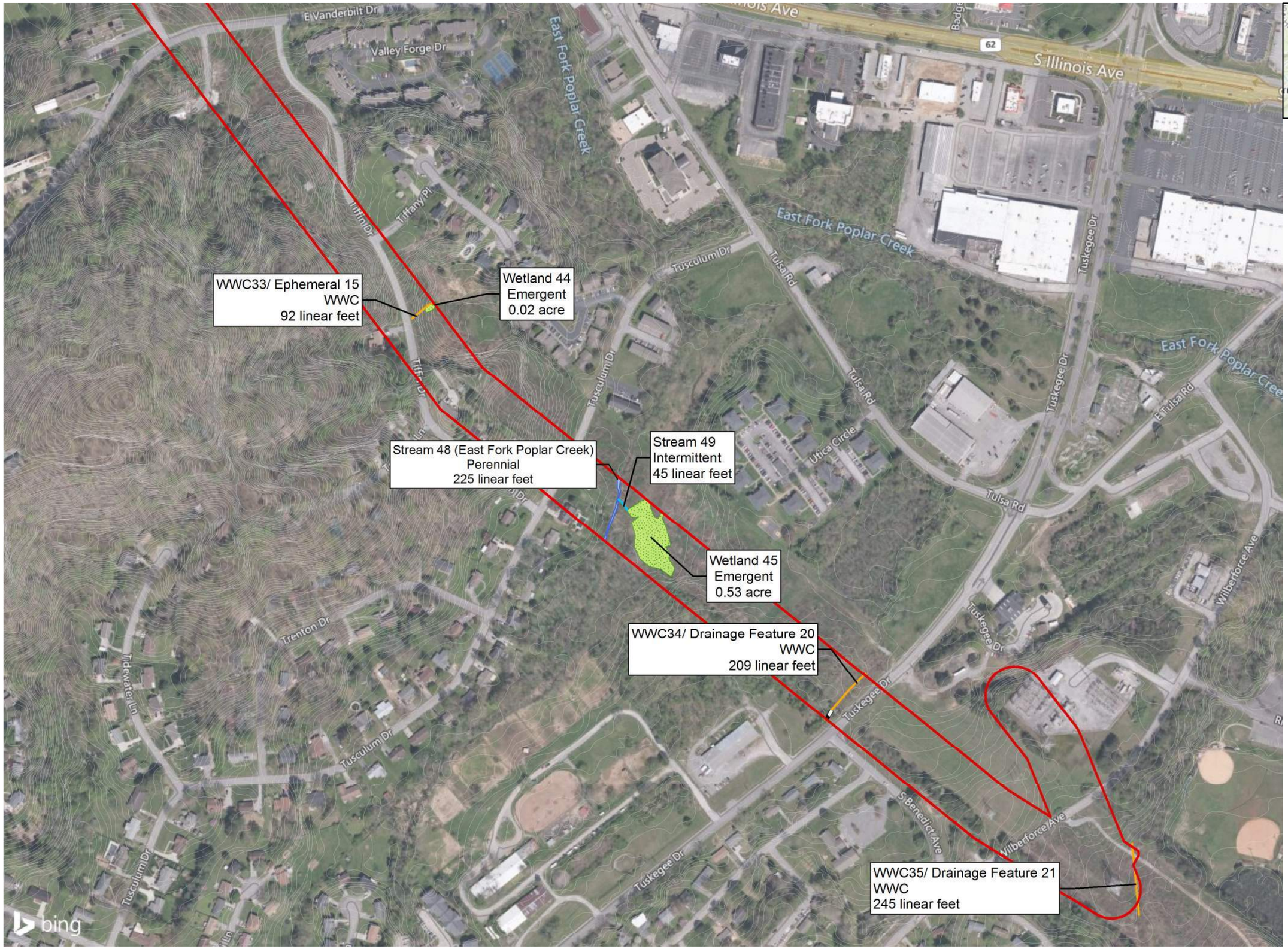

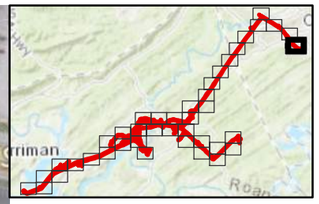

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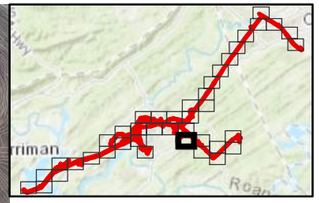

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N

0 Feet 300

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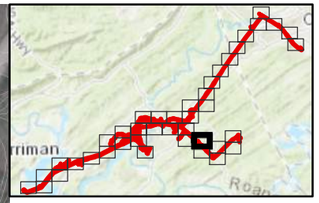

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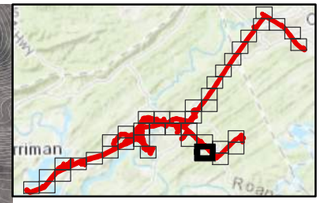

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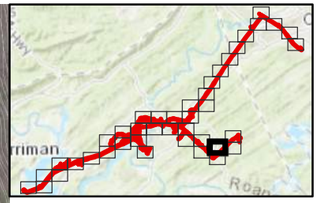

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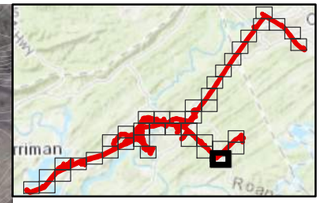

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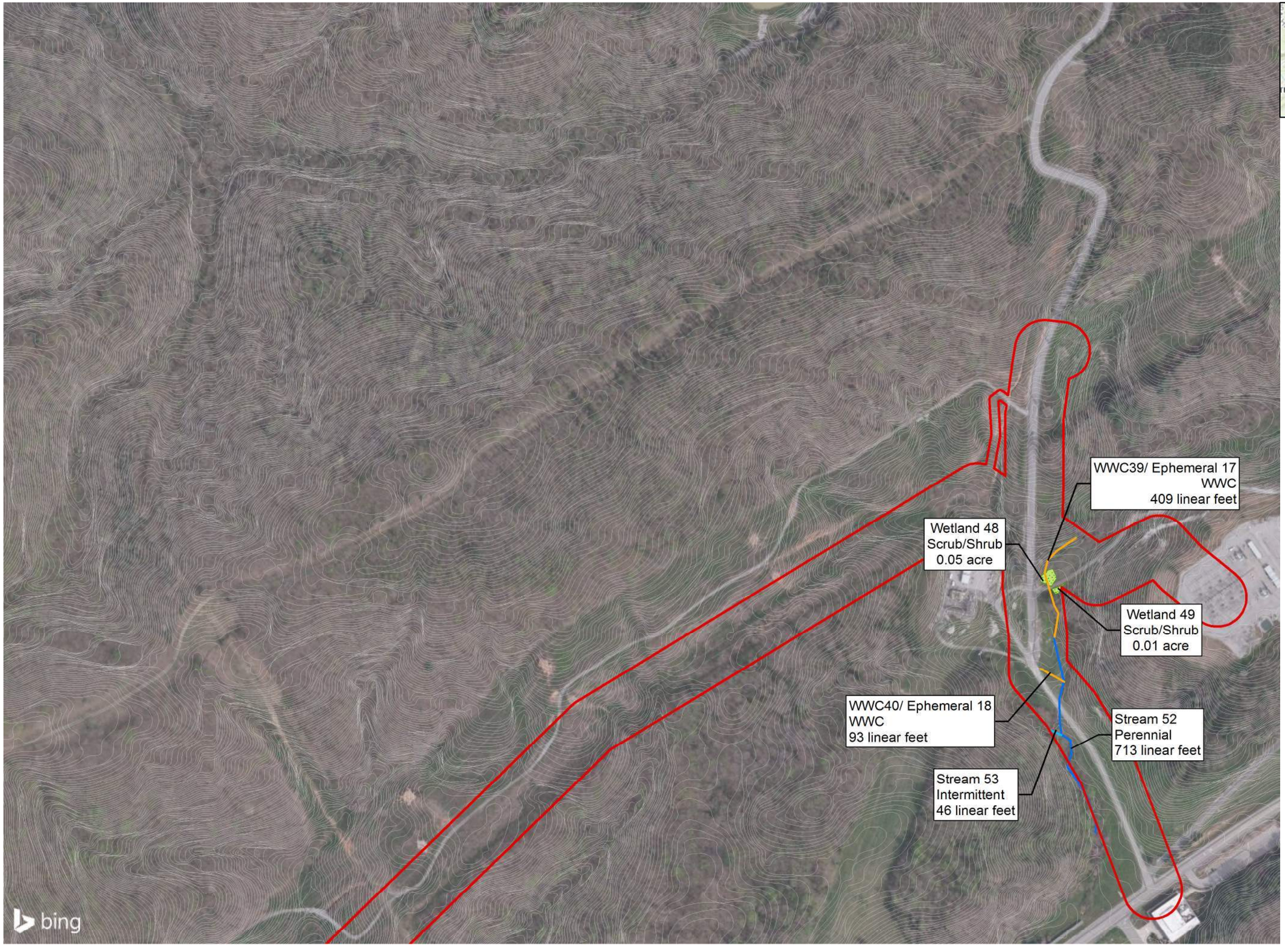

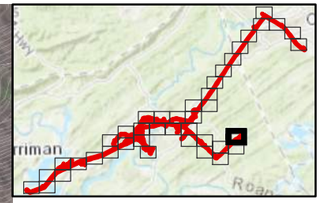

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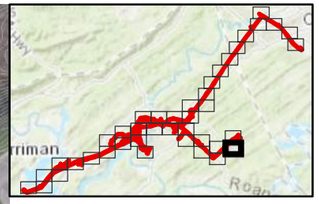

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0 Feet 300

DATA SOURCE: Bing Hybrid Aerial Imagery

Appendix B

Wetland and Stream Data Forms

Wetland USACE Dataforms

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP1-W1

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.015845 Long: -85.050127 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland is contained within transmission line right of way.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 4

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP1-W1

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	50	Yes	OBL
2. *Carex intumescens*	20	Yes	FACW
3. *Ludwigia palustris*	10	No	OBL
4. *Juncus effusus*	5	No	FACW
5. *Panicum sp.*	10	No	
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48		20% of total cover:	19
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		110 (B)

Prevalence Index = B/A = 1.29

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
dead shrubs present from spraying.

SOIL

Sampling Point: DP1-W1

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 3/1	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Texture is silt loam
								charcoal was mixed in the profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP3-W2

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.014901 Long: -85.046211 Datum: NAD83

Soil Map Unit Name: NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Small part of wetland that runs upslope towards some buildings. There is a section on the edge of this wetland that is cleared.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: W2

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Salix nigra*	10	Yes	OBL
2. *Acer rubrum*	10	Yes	FAC
3. *Populus deltoides*	5	No	FAC
4. *Amelanchier*	5	No	
5.			
6.			
7.			
8.			
9.			
	30 =Total Cover		
50% of total cover: 15	20% of total cover: 6		
Herb Stratum (Plot size: 5ft)			
1. *Rubus Sp.*	30	Yes	
2. *Juncus effusus*	20	Yes	FACW
3. *Carex stricta*	10	No	OBL
4. *Lonicera japonica*	10	No	FACU
5. *Carex lurida*	10	No	OBL
6. *Dichanthelium clandestinum*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	80 (A)		170 (B)

Prevalence Index = B/A = 2.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W2

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Texture is a silt loam for top 6inches
6-20	10YR 4/1	50	7.5YR 5/8	50	C	PL/M	Loamy/Clayey	Prominent redox concentrations
								Texture from 6-20 is silty clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/13/2022

Applicant/Owner: TVA State: TN Sampling Point: DP6-W3

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.013965 Long: -85.044934 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Small PEM wetland located between roadway and sloped hill

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP6-W3

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Salix nigra*	10	Yes	OBL
2. *Acer rubrum*	10	Yes	FAC
3. *Populus deltoides*	5	No	FAC
4. *Amelanchier*	5	No	
5.			
6.			
7.			
8.			
9.			
	30 =Total Cover		
50% of total cover: 15	20% of total cover: 6		
Herb Stratum (Plot size: 5ft)			
1. *Rubus Sp.*	30	Yes	
2. *Juncus effusus*	20	Yes	FACW
3. *Carex stricta*	10	No	OBL
4. *Lonicera japonica*	10	No	FACU
5. *Carex lurida*	10	No	OBL
6. *Dichanthelium clandestinum*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	80 (A)		170 (B)

Prevalence Index = B/A = 2.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP6-W3

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Texture is a silt loam for top 6inches
6-20	10YR 4/1	50	7.5YR 5/8	50	C	PL/M	Loamy/Clayey	Prominent redox concentrations
								Texture from 6-20 is silty clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP8-W4

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.012835 Long: -85.041765 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM Wetland located within in active hay field. Connected to Open Water

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP8-W4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	20	Yes	FACW
2. *Hordeum brachyantherum*	40	Yes	FAC
3. *Carex vulpinoidea*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		180 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP8-W4

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	Silty
6-20	2.5Y 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP11-W5

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.008885 Long: -85.031464 Datum: WGS 1984

Soil Map Unit Name: Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PFO wetland abutting Rocky Branch

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP11-W5

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	10	Yes	FAC
2. *Platanus occidentalis*	5	No	FACW
3. *Acer negundo*	20	Yes	FAC
4. *Liriodendron tulipifera*	10	Yes	FACU
5.			
6.			
7.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer rubrum*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover: 2	
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	5	Yes	OBL
2. *Toxicodendron radicans*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover: 3	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	5	x 2 =	10
FAC species	50	x 3 =	150
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	70 (A)		205 (B)

Prevalence Index = B/A = 2.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP11-W5

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Sandy	
3-6	10YR 4/2	100					Sandy	
6-20	5YR 4/6	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP13-W6

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.005536 Long: -85.022705 Datum: NAD83

Soil Map Unit Name: NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
cattle disturbance to soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- X Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 8

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There was standing water in the hoof prints in the soil

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP13-W6

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Rosa palustris*	30	Yes	OBL
2. *Salix nigra*	10	Yes	OBL
3. *Nyssa sylvatica*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	45 =Total Cover		
50% of total cover: 23	20% of total cover: 9		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	30	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Eleocharis obtusa*	20	Yes	OBL
4. *Bidens aristosa*	10	No	FACW
5. *Ludwigia palustris*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	30	x 2 =	60
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		170 (B)

Prevalence Index = B/A = 1.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP13-W6

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	95	10YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
2-20	2.5Y 3/1	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Concentrations in pore lining in top 2 inches
								diffused
								texture is silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP15-W7

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.005558 Long: -85.021606 Datum: NAD83

Soil Map Unit Name: NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
cattle disturbance to soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- X Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 8

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There was standing water in the hoof prints in the soil

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP15-W7

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Rosa palustris*	30	Yes	OBL
2. *Salix nigra*	10	Yes	OBL
3. *Nyssa sylvatica*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	45 =Total Cover		
50% of total cover: 23	20% of total cover: 9		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	30	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Eleocharis obtusa*	20	Yes	OBL
4. *Bidens aristosa*	10	No	FACW
5. *Ludwigia palustris*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	30	x 2 =	60
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		170 (B)

Prevalence Index = B/A = 1.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP15-W7

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	95	10YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
2-20	2.5Y 3/1	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Concentrations in pore lining in top 2 inches
								diffused
								texture is silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022
Applicant/Owner: TVA State: TN Sampling Point: DP16-W8
Investigator(s): J Mace, L Theim, J Kay Section, Township, Range:
Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1-2
Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.003887 Long: -85.017372 Datum: NAD83
Soil Map Unit Name: NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland is in right of way and is by an occupied cow pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 1
Water Table Present?	Yes X	No	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
2 kinds of drainage coming into it, an access road in the middle and a stream below it.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP16-W8

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	40	Yes	OBL
2. *Juncus effusus*	40	Yes	FACW
3. *Lobelia cardinalis*	5	No	FACW
4. *Scutellaria sp.*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	45	x 2 =	90
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		130 (B)

Prevalence Index = B/A = 1.53

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP16-W8

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 3/1	95	10YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Texture is silt loam
								concentrations are diffuse in pore lining

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP18-W9

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 36.001451 Long: -85.011965 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland is below pond that turns into a stream.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturation at surface

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP18-W9

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	70	Yes	OBL
2. *Typha latifolia*	20	No	OBL
3. *Juncus effusus*	5	No	FACW
4. *Carex striata*	5	No	OBL
5. *Ludwigia palustris*	2	No	OBL
6. *Scutellaria Sp.*	2	No	
7.			
8.			
9.			
10.			
11.			
	104 =Total Cover		
50% of total cover: 52	20% of total cover: 21		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	97	x 1 =	97
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	102 (A)		107 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP18-W9

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	90	7.5YR 5/8	10	C	PL	Sandy	Prominent redox concentrations
								Texture is sandy silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: bedrock

Depth (inches): 4

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP20-W10

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.000731 Long: -85.010591 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland located at the bottom of two hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP20-W10

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Rubus sp.*	10	No	
2. *Poa pratensis*	10	No	FACU
3. *Pycnanthemum albescens*	5	No	FACU
4. *Juncus effusus*	20	Yes	FACW
5. *Solidago altissima*	5	No	FACU
6. *Juncus tenuis*	20	Yes	FAC
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	60 (A)		180 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP20-W10

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-20	10YR 3/2	90	10YR 4/6	10	C	PL/M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/14/2022

Applicant/Owner: TVA State: TN Sampling Point: DP22-W11

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.998973 Long: -85.006412 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM portion of a PEM/PFO wetland at the bottom of a hillside

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP22-W11

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex loridia*	10	No	FACW
2. *Poa pratensis*	10	No	FACU
3. *Carex vulpinoidea*	25	Yes	OBL
4. *Juncus effusus*	20	Yes	FACW
5. *Solidago altissima*	5	No	FACU
6. *Juncus tenuis*	10	No	FAC
7.			
8.			
9.			
10.			
11.			
	80 =Total Cover		
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	30	x 2 =	60
FAC species	10	x 3 =	30
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	80 (A)		175 (B)

Prevalence Index = B/A = 2.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP22-W11

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-20	10YR 3/2	95	10YR 5/6	5	C	PL/M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/14/2022

Applicant/Owner: TVA State: TN Sampling Point: DP22-W11

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.998973 Long: -85.006412 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PFO portion of a PEM/PFO wetland at the bottom of a hillside

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP22-W11

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	40	Yes	FAC
2. *Prunus serotina*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Lindera benzoin*	2	No	FAC
2. *Ligustrum lucidum*	2	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	4	=Total Cover	
50% of total cover: 2		20% of total cover: 1	
Herb Stratum (Plot size: 5)			
1. *Panicum sp.*	15	Yes	OBL
2. *Poa pratensis*	10	No	FACU
3. *Carex vulpinoidea*	25	Yes	OBL
4. *Ranunculus abortivus*	10	No	FACW
5. *Solidago altissima*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover: 13	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	10	x 2 =	20
FAC species	42	x 3 =	126
FACU species	20	x 4 =	80
UPL species	2	x 5 =	10
Column Totals:	114 (A)		276 (B)

Prevalence Index = B/A = 2.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP22-W11

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-20	10YR 4/2	90	10YR 4/6	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP26-W12

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.996617 Long: -85.002772 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM connected to a pond within a hay pasture/ cow pasture

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP26-W12

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	20	Yes	FACW
2. *Panicum sp.*	20	Yes	
3. *Typha angustifolia*	10	No	OBL
4. *Carex vulpinoidea*	10	No	FACW
5. *Cyperus esculentus*	5	No	FACW
6. *Solidago altissima*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	50 (A)		100 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP26-W12

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Loamy/Clayey	
4-20	2.5Y 3/1	90	7.5YR 5/6	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP28-W13

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.994324 Long: -84.995521 Datum: WGS 1984

Soil Map Unit Name: Lily-Lonewood complex, 5 to 12 percent slopes, rocky NWI classification: PEM/PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No X

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM/PFO wetland. PFO portion is outside of the study area. The PEM portion is located at the bottom of a slope within a cattle field, disturbed by cattle.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP28-W13

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	30	Yes	OBL
2. *Microstegium vimineum*	10	Yes	FAC
3. *Juncus effusus*	10	Yes	FACW
4. *Cyperus esculentus*	5	No	FACW
5. *Solidago altissima*	5	No	FACU
6. *Panicum sp.*	5	No	
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	15	x 2 =	30
FAC species	10	x 3 =	30
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	60 (A)		110 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP28-W13

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	95	10YR 5/6	5	C	M	Loamy/Clayey	
3-20	2.5Y 3/1	90	7.5YR 4/4	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP30-W14

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.993234 Long: -84.992439 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No X

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Large PEM wetland at the bottom of two hillsides

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP30-W14

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	20	Yes	OBL
2. *Microstegium vimineum*	30	Yes	FAC
3. *Juncus effusus*	10	No	FACW
4. *Cyperus esculentus*	5	No	FACW
5. *Rubus sp.*			
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	15	x 2 =	30
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		140 (B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP30-W14

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 5/2	90	10YR 5/8	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP33-W15

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.993021 Long: -84.992031 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No X

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Large PEM wetland at the bottom of two hillsides

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP33-W15

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	20	Yes	OBL
2. *Microstegium vimineum*	30	Yes	FAC
3. *Juncus effusus*	10	No	FACW
4. *Cyperus esculentus*	5	No	FACW
5. *Rubus sp.*			
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	15	x 2 =	30
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		140 (B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP33-W15

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 5/2	90	10YR 5/8	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP34-W16

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.989622 Long: -84.98442 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Unmapped PEM wetland at the bottom of two hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP34-W16

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer rubrum*	5	Yes	FAC
2. *Rubus sp.*			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		
Herb Stratum (Plot size: 5)			
1. *Dichanthelium clandestinum*	60	Yes	FAC
2. *Pycnanthemum albescens*	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	75 (A)		235 (B)

Prevalence Index = B/A = 3.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP34-W16

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/3	80	2.5Y 6/6	20	C	M	Loamy/Clayey	
8-20	10YR 4/2	95	10YR 4/6	5	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022
Applicant/Owner: TVA State: TN Sampling Point: DP36-W17
Investigator(s): J Mace, B Hartshorn Section, Township, Range:
Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 4-6
Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.914149 Long: -84.478822 Datum: NAD83
Soil Map Unit Name: NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
This is a fingered wetland that leads to a pond. There is a blue line stream on NWI, but none were present. There is a WWC below the pond, but soils are not hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0.5

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP36-W17

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Liquidambar styraciflua*	2	No	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	2 =Total Cover		
50% of total cover: 1	20% of total cover: 1		
Herb Stratum (Plot size: 5ft)			
1. *Scirpus microcarpus*	40	Yes	OBL
2. *Leersia oryzoides*	30	Yes	OBL
3. *Juncus effusus*	10	No	FACW
4. *Carex lurida*	10	No	OBL
5. *Carex striata*	5	No	OBL
6. *Polygonum punctatum*	5	No	OBL
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	10	x 2 =	20
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	102 (A)		116 (B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP36-W17

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/1	100						texture is silty loam with gravel
5-16	10YR 4/1	95	7.5YR 5/8	5	C	M	Loamy/Clayey	Prominent redox concentrations
								concentrations were diffused in matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: bedrock

Depth (inches): 16

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP38-W18

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.915674 Long: -84.47362 Datum: NAD83

Soil Map Unit Name: NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland fringes on S2C and appears to be an old pond. There is a berm that seems to have been cut for the stream to flow through. Sides seem to be excavated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 1

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP38-W18

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Salix nigra*	30	Yes	OBL
2. *Elaeagnus umbellata*	10	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	40 =Total Cover		
50% of total cover: 20	20% of total cover: 8		
Herb Stratum (Plot size: 5ft)			
1. *Microstegium vimineum*	50	Yes	FAC
2. *Boehmeria cylindrica*	30	Yes	FACW
3. *Leersia oryzoides*	10	No	OBL
4. *Polygonum punctatum*	5	No	OBL
5. *Dichanthelium clandestinum*	5	No	FAC
6. *Bidens aristosa*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
	105 =Total Cover		
50% of total cover: 53	20% of total cover: 21		
Woody Vine Stratum (Plot size: 30ft)			
1. *Campsis radicans*	5	Yes	FAC
2.			
3.			
4.			
5.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	35	x 2 =	70
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	150 (A)		345 (B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP38-W18

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
4-20	10YR 5/2	60	10YR 5/8	30	C	M	Loamy/Clayey	Prominent redox concentrations
								Gravel was mixed in 4-20 layer with a color of 10YR 5/1
								Texture was Loamy Silt with increasing gravel as the profile got deeper

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

There was a mixed matrix present after 4inches. Lots of disturbance.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane Co. Sampling Date: 6/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP40-W19

Investigator(s): Josh Mace, Blake Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.916457 Long: -84.471149 Datum: NAD83

Soil Map Unit Name: AmC - Armuchee silt loam, 5 to 12 percent slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
W1C_Wet is representative of Wetland 19. Climatic/hydrologic conditions were drier than normal as determined by the USACE Antecedent Precipitation Tool.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP40-W19

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus argutus*	15	Yes	FACU
2. *Acer rubrum*	5	Yes	FAC
3. *Elaeagnus angustifolia*	5	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	25 =Total Cover		
50% of total cover: 13	20% of total cover: 5		
Herb Stratum (Plot size: 5)			
1. *Scirpus microcarpus*	80	Yes	OBL
2. *Leersia oryzoides*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110 =Total Cover		
50% of total cover: 55	20% of total cover: 22		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is dominant

SOIL

Sampling Point: DP40-W19

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 4/2	80	7.5YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21/2022
Applicant/Owner: TVA State: TN Sampling Point: DP42-W20
Investigator(s): J Mace, B Hartshorn Section, Township, Range:
Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4
Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.917268 Long: -84.468740 Datum: NAD83
Soil Map Unit Name: NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland ties into WWC that runs through the middle of the valley. The WWC is the boundary on the east side of the wetland and it is open on the south end.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 20
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP42-W20

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Liquidambar styraciflua*	5	Yes	FAC
2. *Prunus avium*	2	No	UPL
3. *Rosa palustris*	5	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
	12 =Total Cover		
50% of total cover: 6	20% of total cover: 3		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	60	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Dichanthelium clandestinum*	10	No	FAC
4. *Rubus sp.*	5	No	
5. *Lanisra japonica*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	20	x 2 =	40
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	2	x 5 =	10
Column Totals:	102 (A)		160 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
The Rubus Sp. Is more common throughout the wetland, but not in the selected data point.

SOIL Sampling Point: DP42-W20

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 4/2	90	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
			10YR 6/1	5	D	M		Texture is Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

There is charcoal and gravel throughout the soil profile.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP44-W21

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.917747 Long: -84.467428 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
This wetland is a PEM wetland that starts out linear and then blows out into a larger wetland

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 20
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP44-W21

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Liquidambar styraciflua*	5	Yes	FAC
2. *Prunus avium*	2	No	UPL
3. *Rosa palustris*	5	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
	12 =Total Cover		
50% of total cover: 6	20% of total cover: 3		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	60	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Dichanthelium clandestinum*	10	No	FAC
4. *Rubus sp.*	5	No	
5. *Lanisra japonica*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	20	x 2 =	40
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	2	x 5 =	10
Column Totals:	102 (A)		160 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
The Rubus Sp. Is more common throughout the wetland, but not in the selected data point.

SOIL

Sampling Point: DP44-W21

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 4/2	90	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
			10YR 6/1	5	D	M		Texture is Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

There is charcoal and gravel throughout the soil profile.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP46-W22

Investigator(s): J Mace Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.919204 Long: -84.464462 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Blue Line stream is shown on map but no channel was present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP46-W22

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	20	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Salix nigra*	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		
Herb Stratum (Plot size: 5ft)			
1. *Juncus effusus*	50	Yes	FACW
2. *Carex lurida*	10	No	OBL
3. *Boehmeria cylindrica*	10	No	FACW
4. *Diodia virginiana*	10	No	FACW
5. *Persicaria punctata*	5	No	OBL
6. *Microstegium vimineum*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	70	x 2 =	140
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		195 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Willows around pond outside of project area

SOIL

Sampling Point: DP46-W22

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/2	70	7.5YR 5/8	30	C	PL/M	Loamy/Clayey	Silt Loam Texture and Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

cows actively grazing

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP48-W23

Investigator(s): J Mace , B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.919253 Long: -84.462020 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland is in hayfield. Starts within project boundary and appears to be a groundwater expression that flows across the field and outside the project boundary

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP48-W23

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Juncus effusus*	50	Yes	FACW
2. *Diodia virginiana*	30	Yes	FACW
3. *Trifolium repens*	10	No	FACU
4. *Fescue sp.*	5	No	
5. *Plantago lanceolata*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	5	x 5 =	25
Column Totals:	95 (A)		225 (B)

Prevalence Index = B/A = 2.37

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP48-W23

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/2	80	7.5YR 5/8	10	C	PL/M	Loamy/Clayey	Prominent redox concentrations
			10YR 7/1	10	D	M		Silt Loam Texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP50-W24

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.919806 Long: -84.460770 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland is in middle of cow pasture. An almost dried-up pond is to the east of the wetland. This wetland is actively grazed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP50-W24

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Juncus tenuis*	60	Yes	FAC
2. *Juncus canadensis*	10	No	OBL
3. *Solidago sp.*	10	No	
4. *Trifolium repens*	5	No	FACU
5. *Eleocharis obtusa*	5	No	OBL
6. *Ludwigia sp.*	5	No	
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	80 (A)		215 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP50-W24

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/2	90	7.5YR 5/8	10	C	PL	Loamy/Clayey	Prominent redox concentrations
								Silt Loam Texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

The soil had been slightly disturbed due to cattle grazing

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20

Applicant/Owner: TVA State: TN Sampling Point: DP52-W25

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 35.920480 Long: -84.457555 Datum: NAD83

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland seems to be formed by drainage on shale. There is a pond on the NWI map south of the wetland, but it appears to be filled in and compressed with a few wetland plants, but not a wetland itself.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP52-W25

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Platanus occidentalis*	5	Yes	FACW
2. *Xanthium strumarium*	2	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	7 =Total Cover		
50% of total cover: 4	20% of total cover: 2		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	20	Yes	OBL
2. *Juncus canadensis*	20	Yes	OBL
3. *Eleocharis obtusa*	20	Yes	OBL
4. *Ludwigia palustris*	10	No	OBL
5. *Typha latifolia*	10	No	OBL
6. *Bidens aristosa*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	10	x 2 =	20
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	92 (A)		106 (B)

Prevalence Index = B/A = 1.15

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP52-W25

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	90	10YR 5/8	10	C	PL/M	Loamy/Clayey	Prominent redox concentrations
16-18	10YR 4/3	100						Texture is Silty Clay Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: Shale

Depth (inches): 16

Hydric Soil Present? **Yes** X **No** ___

Remarks:

at 16 inches, the soil became mainly shale bits with a little bit of silt.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21/2022
Applicant/Owner: TVA State: TN Sampling Point: DP54-W26
Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:
Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 1-2
Subregion (LRR or MLRA): LRR N, MLRA 128 Lat:
Soil Map Unit Name:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
PSS/PFO Wetland. PFO is outside of the TVA ROW

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- X Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 8

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There was standing water in the hoof prints in the soil

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP54-W26

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Rosa palustris*	30	Yes	OBL
2. *Salix nigra*	10	Yes	OBL
3. *Nyssa sylvatica*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	45 =Total Cover		
50% of total cover: 23	20% of total cover: 9		
Herb Stratum (Plot size: 5ft)			
1. *Carex lurida*	30	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Eleocharis obtusa*	20	Yes	OBL
4. *Bidens aristosa*	10	No	FACW
5. *Ludwigia palustris*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	30	x 2 =	60
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		170 (B)

Prevalence Index = B/A = 1.31

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP54-W26

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	95	10YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
2-20	2.5Y 3/1	95	7.5YR 5/8	5	C	PL	Loamy/Clayey	Prominent redox concentrations
								Concentrations in pore lining in top 2 inches diffused texture is silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP58-W27

Investigator(s): L.Thiem, L. Hue, and B. Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.932806 Long: -84.420730 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 6 to 12 percent slopes NWI classification: PEM/PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM/ PSS Wetland located at the edge of the Clinch River channel.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 16

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP58-W27

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	20	Yes	FACW
2. *Hordeum brachyantherum*	40	Yes	FAC
3. *Carex vulpinoidea*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover:	14	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		180 (B

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP58-W27

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	Silty
6-20	2.5Y 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/24/2022

Applicant/Owner: TVA State: TN Sampling Point: DP58-W28

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.936313 Long: -84.411968 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil Yes , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PSS Wetland. Point taken near contaminated water so soils data was not taken.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP58-W28

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix nigra*	10	Yes	OBL
2. *Quercus phellos*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	15 =Total Cover		
50% of total cover: 8	20% of total cover: 3		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	20	Yes	OBL
2. *Carex vulpinoidea*	30	Yes	FACW
3. *Phyla lanceolata*	20	Yes	OBL
4. *Hibiscus moscheutos*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
50% of total cover: 38	20% of total cover: 15		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	30	x 2 =	60
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		130 (B)

Prevalence Index = B/A = 1.44

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP58-W28

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils were not taken due to contamination

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/24/2022

Applicant/Owner: TVA State: TN Sampling Point: DP61-W29

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.927300 Long: -84.402255 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil Yes , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PSS wetland off the side of a roadway. A WWC blows out into the PSS and comes back together after it.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP61-W29

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Phalaris arundinacea*	70	Yes	FACW
2. *Carex sp.*			
3. *Rubus sp.*			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		140 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP61-W29

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/24/2022

Applicant/Owner: TVA State: TN Sampling Point: DP63-W30

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.927923 Long: -84.403228 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil Yes , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP63-W30

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Phalaris arundinacea*	70	Yes	FACW
2. *Carex sp.*			
3. *Rubus sp.*			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		140 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP63-W30

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP64-W31

Investigator(s): L.Thiem, B. Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.942531 Long: -84.413743 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland within TVA poerline ROW. This wetland is at the bottom of two large hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP64-W31

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1. *Aster sp.*	5	No	FAC
2. *Carex sp.*	30	Yes	OBL
3. *Microstegium vimineum*	10	Yes	FAC
4. *Boehmeria cylindrica*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 =Total Cover		
50% of total cover:	25	20% of total cover:	10

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	5	x 2 =	10
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	50 (A)		85 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP64-W31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					Loamy/Clayey	
2-20	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP67-W33

Investigator(s): L.Thiem, B. Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.944227 Long: -84.397141 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM/PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM/ PFO Wetland located near east for Poplar Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- x Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP67-W33

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Aster sp.*	5	No	FAC
2. *Carex sp.*	30	Yes	OBL
3. *Microstegium vimineum*	10	No	FAC
4. *Boehmeria cylindrica*	5	No	FACW
5. *Juncus effusus*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	55 =Total Cover		
50% of total cover: 28	20% of total cover: 11		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	55 (A)		95 (B)

Prevalence Index = B/A = 1.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP67-W33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					Loamy/Clayey	
2-20	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP68-W34

Investigator(s): L.Thiem, B. Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947278 Long: -84.387772 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland within TVA poerline ROW. This wetland is at the bottom of two large hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP68-W34

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1. *Aster sp.*	10	No	FAC
2. *Carex sp.*	20	Yes	OBL
3. *Microstegium vimineum*	20	Yes	FAC
4. *Festuca arundinacea*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
50% of total cover: 30		20% of total cover: 12	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	60 (A)		150 (B)
Prevalence Index = B/A =			2.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP68-W34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					Loamy/Clayey	
2-20	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/21/2022

Applicant/Owner: TVA State: TN Sampling Point: DP70-W35

Investigator(s): L.Thiem, B. Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.945894 Long: -84.385764 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland within TVA poerline ROW. This wetland is at the bottom of two large hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- x Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP70-W35

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Toxicodendron radicans*	5	No	FAC
2. *Carex sp.*	20	Yes	OBL
3. *Microstegium vimineum*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	45 =Total Cover		
50% of total cover: 23	20% of total cover: 9		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	45 (A)		95 (B)

Prevalence Index = B/A = 2.11

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP70-W35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					Loamy/Clayey	
4-20	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP72-W36

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947537 Long: -84.367221 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PFO wetland abutting Bear Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP72-W36

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carpinus caroliniana*	15	Yes	FAC
2. *Platanus occidentalis*	20	Yes	FACW
3. *Acer negundo*	5	No	FAC
4.			
5.			
6.			
7.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover: 8	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Carpinus caroliniana*	10	Yes	FAC
2. *Acer negundo*	20	Yes	FAC
3. *Ligustrum sinense*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover: 7	
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	No	OBL
2. *Microstegium vimineum*	40	Yes	FAC
3. *Carex tribuloides*	10	No	FACW
4. *Boehmeria cylindrica*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover: 13	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	90	x 3 =	270
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	140 (A)		370 (B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP72-W36

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-20	10YR 4/2	95	10YR 5/6	5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP73-W37

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): floodplain Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947482 Long: -84.366640 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM portion of a PEM/PFO wetland abutting Bear Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP73-W37

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	5	No	OBL
2. *Platanus occidentalis*	30	Yes	FACW
3. *Acer rubrum*	10	No	FAC
4. *Carpinus caroliniana*	30	Yes	FAC
5.			
6.			
7.			
	75	=Total Cover	
50% of total cover: 38		20% of total cover: 15	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Carpinus caroliniana*	5	No	FAC
2. *Lindera benzoin*	15	Yes	FAC
3. *Ligustrum sinense*	10	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover: 6	
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	No	OBL
2. *Toxicodendron radicans*	20	Yes	FAC
3. *Microstegium vimineum*	30	Yes	FAC
4. *Boehmeria cylindrica*	5	No	FACW
5. *Verbesina alternifolia*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover: 14	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	35	x 2 =	70
FAC species	115	x 3 =	345
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	175 (A)		470 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP73-W37

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-20	10YR 4/2	95	10YR 5/6	5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP74-W38

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947204 Long: -84.367025 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
PFO wetland abutting Bear Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP74-W38

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carpinus caroliniana*	5	No	FAC
2. *Platanus occidentalis*	30	Yes	FACW
3. *Acer negundo*	5	No	FAC
4. *Acer saccharum*	10	Yes	FACU
5.			
6.			
7.			
	50	=Total Cover	
50% of total cover: 25		20% of total cover:	10
Sapling/Shrub Stratum (Plot size: 15)			
1. *Carpinus caroliniana*	10	Yes	FAC
2. *Fraxinus pennsylvanica*	5	Yes	FACW
3. *Acer saccharum*	5	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	Yes	OBL
2. *Microstegium vimineum*	15	Yes	FAC
3. *Toxicodendron radicans*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover:	7
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	45	x 3 =	135
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	105 (A)		275 (B)

Prevalence Index = B/A = 2.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP74-W38

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Loamy/Clayey	Silty
10-20	10YR 4/2	95	7.5YR 4/4	5	C	M	Loamy/Clayey	Silty

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP76-W39

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947908 Long: -84.364273 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
PEM portion of a PEM/PFO wetland abutting Bear Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP76-W39

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	Yes	OBL
2. *Juncus effusus*	5	No	FACW
3. *Carex vulpinoidea*	20	Yes	OBL
4. *Cyperus esculentus*	10	Yes	FACW
5. *Typha angustifolia*	10	Yes	OBL
6. *Rubus sp.*			
7.			
8.			
9.			
10.			
11.			
	55 =Total Cover		
50% of total cover: 28	20% of total cover: 11		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	55 (A)		70 (B)

Prevalence Index = B/A = 1.27

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP76-W39

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-20	10YR 5/2	90	10YR 5/6	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP80-W40

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.003 Long: -84.263 Datum: WGS 1984

Soil Map Unit Name: Chenneby silt loan, frequently flooded NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland within TVA poerline ROW. This wetland is at the bottom of two large hills and connects to stream 35

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP80-W40

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	Yes	OBL
2. *Juncus effusus*	20	Yes	FACW
3. *Aster sp.*	10	Yes	FACW
4. *Persicaria amphibia*	5	No	FACW
5. *Ambrosia acanthicarpa*	5	No	UPL
6. *Scripus cyperinus*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
	55 =Total Cover		
50% of total cover: 28	20% of total cover: 11		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	55 (A)		115 (B)

Prevalence Index = B/A = 2.09

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP80-W40

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/2	95	10YR 5/6	5	C	M	Loamy/Clayey	Silty

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP82-W41

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.966534 Long: 84.347361 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM wetland within TVA poerline ROW. This wetland is at the bottom of two large hills

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP82-W41

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carpinus caroliniana*	30	Yes	FAC
2. *Juglans nigra*	5	No	FACU
3. *Liquidambar styraciflua*	5	No	FAC
4. *Acer saccharum*	5	No	FACU
5.			
6.			
7.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Carpinus caroliniana*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover: 3	
Herb Stratum (Plot size: 5)			
1. *Toxicodendron radicans*	30	Yes	FAC
2. *Saururus cernuus*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover: 7	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	80	x 3 =	240
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	95 (A)		285 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP82-W41

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					Loamy/Clayey	
4-20	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP84-W42

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.969776° Long: X Datum: WGS 1984

Soil Map Unit Name: Colbert-Lyerly-Rock outcrop complex, 5 to 20 percent slopes NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PFO WETLAND ABUTTING STREAM 17 (VERY LARGE STREAM)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
WETLAND HYDROLOGY IS PRESENT

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP84-W42

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Platanus occidentalis*	30	Yes	FACW
2. *Acer negundo*	30	Yes	FAC
3. *Ulmus americana*	10	No	FACW
4.			
5.			
6.			
7.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover: 14	

Sapling/Shrub Stratum (Plot size:)			
1. *Ligustrum*	30	Yes	
2. *Acer negundo*	5	No	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover: 7	

Herb Stratum (Plot size:)			
1. *Lonicera*	5	No	
2. *Phalaris arundinacea*	15	Yes	
3. *Microstegium vimineum*	2	No	
4. *Impatiens capensis*	10	Yes	
5. *Glechoma hederacea*	10	Yes	
6. *Toxicodendron radicans*	10	Yes	FAC
7.			
8.			
9.			
10.			
11.			
	52	=Total Cover	
50% of total cover: 26		20% of total cover: 11	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 42.9% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		200 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) o more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP84-W42

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2	100						SILTY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
NATURALLY PROBEMATIC

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP86-W43

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSIDE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.023625° Long: -84.295268° Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
PEM FRINGE WETLAND, AT STREAM 44

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP86-W43

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1.			
2.			FACW
3.			
4.			
5.			
6.			
7. *Leersia oryzoides*	60	Yes	OBL
8. *Verbesina alternifolia*	5	No	FAC
9. *Saururus cernuus*	30	Yes	OBL
10. *Carex lurida*	2	No	OBL
11. *Impatiens capensis*	2	No	FACW
	99 =Total Cover		
50% of total cover: 50	20% of total cover:	20	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	92	x 1 =	92
FACW species	2	x 2 =	4
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	99 (A)		111 (B

Prevalence Index = B/A = 1.12

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP86-W43

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5YR 4/2	93	10YR 4/3	3	C	M		SILTY CLAY LOAM
			10YR 4/6	2	C	M		SILTY CLAY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP89-W44

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSIDE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.004803° Long: -84.265652° Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification: PSS/PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PEM, WITHIN TVA ROW, NEAR EROSIONAL FEATURE OUTSIDE STUDY AREA

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- x Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP89-W44

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1.			
2.			FACW
3.			
4.			
5.			
6.			
7. Narrow-Leaf Cat-Tail	20	Yes	
8. *Rosa palustris*	10	Yes	OBL
9. *Juncus effusus*	10	Yes	FACW
10. *Carex lurida*	10	Yes	OBL
11. *Solidago altissima*	5	No	FACU
	55 =Total Cover		
50% of total cover: 28	20% of total cover:	11	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	35 (A)		60 (B

Prevalence Index = B/A = 1.71

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP89-W44

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2	95	10YR 5/6	5				SILTY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **LRR N)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
___ Thin Dark Surface (S9) **MLRA 147, 148)**
___ Loamy Mucky Mineral (F1) **MLRA 136)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
___ Umbric Surface (F13) **MLRA 122, 136)**
___ Piedmont Floodplain Soils (F19) **MLRA 148)**
___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **MLRA 147)**
___ Coast Prairie Redox (A16) **MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP91-W45

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.002515° Long: -84.263255° Datum: WGS 1984

Soil Map Unit Name: Chenneby silt loam, frequently flooded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
depressional wetland within TVA ROW, doesn't go into forested area

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP91-W45

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Carex lurida*	10	No	
2. *Juncus effusus*	30	Yes	FACW
3. *Persicaria*	10	No	
4. *Oligoneuron*	10	No	
5. *Carex*	5	No	
6. *Aster*	30	Yes	
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		60 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) o more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP91-W45

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100						LOAM
4-20	10YR 4/2	95	7.5YR 4/6	5				SILTY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/22/2022

Applicant/Owner: TVA State: TN Sampling Point: DP94-W46

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947278 Long: -84.387772 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
PEM wetland off th side of a gravel road, a WWC runs through it.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP94-W46

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Typha angustifolia*	50	Yes	OBL
2. *Juncus effusus*	10	No	FACW
3. *Solidago altissima*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	65 (A)		90 (B)

Prevalence Index = B/A = 1.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP94-W46

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10yr 4/3	60	2.5yr 5/6	40	C	M	Loamy/Clayey	RESTRICTIVE AT 10 INCHES

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/22/2022

Applicant/Owner: TVA State: TN Sampling Point: DP96-W47

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.922853 Long: -84.335932 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PSS wetland that abuts a stream at the bottom of two hillslopes

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP96-W47

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	10	Yes	FAC
2. *Platanus occidentalis*	10	Yes	FACW
3. *Liquidambar styraciflua*	5	No	FAC
4. *Juniperus virginiana*	5	No	FACU
5.			
6.			
7.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover: 6	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1. *Carex lurida*	15	Yes	OBL
2. *Toxicodendron radicans*	5	No	FAC
3. *Dichanthelium clandestinum*	10	Yes	FAC
4. *Juncus effusus*	10	Yes	FACW
5. *Verbesina alternifolia*	5	No	FAC
6. *Solidago altissima*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
	50	=Total Cover	
50% of total cover: 25		20% of total cover: 10	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	20	x 2 =	40
FAC species	35	x 3 =	105
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	80 (A)		200 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP96-W47

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 5/2	98	10YR 5/6	2	C	M	Loamy/Clayey	Resistance after 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/24/2022

Applicant/Owner: TVA State: TN Sampling Point: DP98-W48

Investigator(s): L.Thiem, B. Hartshorn, and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.947278 Long: -84.387772 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
PSS wetland off the side of a roadway. A WWC blows out into the PSS and comes back together after it.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP98-W48

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Platanus occidentalis*	60	Yes	FACW
2. *Salix nigra*	5	No	OBL
3. *Prunus serotina*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Herb Stratum (Plot size: 5)			
1. *Toxicodendron radicans*	20	Yes	FAC
2. *Solidago altissima*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25 =Total Cover		
50% of total cover: 13	20% of total cover: 5		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	60	x 2 =	120
FAC species	20	x 3 =	60
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	95 (A)		225 (B)

Prevalence Index = B/A = 2.37

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is present

SOIL

Sampling Point: DP98-W48

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10yr 4/3	60	2.5yr 5/6	40	C	M	Loamy/Clayey	RESTRICTIVE AT 10 INCHES

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric Soils are present.

Upland USACE Dataforms

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP2-UP1

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.770347 Long: -90.272402 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Site is upslope of W1BPEM.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP2-UP1

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Poaceae sp.*	60	Yes	
2. *Pycnanthemum incanum*	10	No	UPL
3. *Fragaria vesca*	10	No	FACU
4. *Rosa palustris*	5	No	OBL
5. *Rubus sp.*	5	No	
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	25 (A)		95 (B)
Prevalence Index = B/A =			3.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP2-UP1

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	Texture is loam
2-20	7.5YR 4/3	100					Loamy/Clayey	Texture is loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP5-UP2

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.770099 Long: -90.271342 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Site is upslope of Wetland 2

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: _____

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Poaceae sp.*	60	Yes	
2. *Pycnanthemum incanum*	10	No	UPL
3. *Fragaria vesca*	10	No	FACU
4. *Rosa palustris*	5	No	OBL
5. *Rubus sp.*	5	No	
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	25 (A)		95 (B)
Prevalence Index = B/A =			3.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	Texture is loam
2-20	7.5YR 4/3	100					Loamy/Clayey	Texture is loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP7-UP3

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: Long: Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	

Remarks:
Site is upslope of Wetland 2

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP7-UP3

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Poaceae sp.*	60	Yes	
2. *Pycnanthemum incanum*	10	No	UPL
3. *Fragaria vesca*	10	No	FACU
4. *Rosa palustris*	5	No	OBL
5. *Rubus sp.*	5	No	
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	25 (A)		95 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP7-UP3

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	Texture is loam
2-20	7.5YR 4/3	100					Loamy/Clayey	Texture is loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/16/2022

Applicant/Owner: TVA State: TN Sampling Point: DP9-UP4

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.769548 Long: -90.269820 Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No X**
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
UPLAND POINT IN HYDRIC SOIL NEAR BLUE LINE STREAM AND NEAR WETLAND 4

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
WETLAND HYDROLOGY IS NOT PRESENT

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP9-UP4

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	40	Yes	FACU
2. *Acer rubrum*	20	Yes	FAC
3. *Prunus serotina*	15	Yes	FACU
4.			
5.			
6.			
7.			
	75	=Total Cover	
50% of total cover: 38		20% of total cover:	15
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size:)			
1. *Grass sp.*	60	Yes	
2. *Poa pratensis*	10	No	
3. *Potentilla indica*	10	No	
4. *Taraxacum*	5	No	
5. *Trifolium repens*	10	No	
6.			
7.			
8.			
9.			
10.			
11.			
	95	=Total Cover	
50% of total cover: 48		20% of total cover:	19
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	75 (A)		280 (B

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP9-UP4

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100						SILTY LOAM
4-12	10YR 4/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP12-UP6

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 5-10

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.768461 Long: -90.266625 Datum: WGS 1984

Soil Map Unit Name: Ramsey-Rock outcrop complex, 12 to 20 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken in a hydric soils area. No wetland was determined to occur here.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP12-UP6

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus virginiana*	30	Yes	UPL
2. *Liriodendron tulipifera*	20	Yes	FACU
3. *Acer saccharum*	5	No	FACU
4.			
5.			
6.			
7.			
	55	=Total Cover	
50% of total cover: 28	20% of total cover: 11		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Ligustrum sinense*	10	Yes	FACU
2. *Liriodendron tulipifera*	5	Yes	FACU
3. *Rosa multiflora*	5	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	20	=Total Cover	
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 5)			
1. *Duchesnea indica*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5	=Total Cover	
50% of total cover: 3	20% of total cover: 1		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	30	x 5 =	150
Column Totals:	80 (A)		350 (B

Prevalence Index = B/A = 4.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP12-UP6

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 2.5/1	80	7.5YR 5/1	20	C	M	Loamy/Clayey	
2-8	10YR 6/3	100					Loamy/Clayey	
8-20	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP17-UP8

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.767163 Long: -90.262337 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Point is on hillslope above W7BPEM. Point looks recently cut for hay.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP17-UP8

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Trifolium repens*	70	Yes	FACU
2. *Festuca sp.*	20	Yes	
3. *Ranunculus sp.*	5	No	
4. *Taraxacum sp.*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	70 (A)		280 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP17-UP8

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100					Sandy	Texture is very fine sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: bedrock

Depth (inches): 6

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP19-UP9

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 2-6

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.766428 Long: -90.260662 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Upland point is over looking W6BPEM. Within maintained right of way.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP19-UP9

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Potentilla Simplex*	60	Yes	FACU
2. *Smilax auriculata*	10	No	FACU
3. *Vaccinium angustifolium*	5	No	FACU
4. *Festuca sp.*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 =Total Cover		
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	15 (A)		60 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP19-UP9

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/4	100					Sandy	texture is a fine sandy loam
								at 20inches charcoal is present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP21-UP10

Investigator(s): J Mace, L Thiem, J Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.766252 Long: -90.260218 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Site is upslope from W5B. Within transmission line right of way.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP21-UP10

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Festuca sp.*	60	Yes	
2. *Potentilla simplex*	40	Yes	FACU
3. *Smilax auriculata*	10	No	FACU
4. *Asclepias sp.*	5	No	
5. *Pycnanthemum incanum*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	120 =Total Cover		
50% of total cover: 60	20% of total cover: 24		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	5	x 5 =	25
Column Totals:	15 (A)		65 (B)

Prevalence Index = B/A = 4.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Dead pine tree in the middle that had been sprayed.

SOIL

Sampling Point: DP21-UP10

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/4	100					Sandy	texture is fine sandy loam throughout the profile
2-11	10YR 3/3	100					Sandy	
11-20	10YR 4/3	80	7.5YR 5/8	20	C	PL/M	Sandy	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/14/2022

Applicant/Owner: TVA State: TN Sampling Point: DP23-UP11

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.765623 Long: -90.258457 Datum: WGS 1984

Soil Map Unit Name: Ramsey-Rock outcrop complex, 12 to 20 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 11.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP23-UP11

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	30	Yes	FACU
2. *Rubus sp.*	10	Yes	
3. *Solidago altissima*	5	No	FACU
4. *Carex vulpinoidea*	2	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	47 =Total Cover		
50% of total cover: 24	20% of total cover:	10	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	37 (A)		142 (B

Prevalence Index = B/A = 3.84

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP23-UP11

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP27-UP13

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.764973 Long: -90.257484 Datum: WGS 1984

Soil Map Unit Name: Lily loam, 2 to 6 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 12

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP27-UP13

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Parathelypteris noveboracensis*	30	Yes	FAC
2. *Asclepias syriaca*	5	No	FACU
3. *Solidago altissima*	20	Yes	FACU
4. *Ambrosia trifida*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
50% of total cover: 30	20% of total cover: 12		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	60 (A)		205 (B)

Prevalence Index = B/A = 3.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) o more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP27-UP13

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/4	100					Loamy/Clayey	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP29-UP14

Investigator(s): L.Thiem, J. Mace, and J. Kay Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 5-10

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.764558 Long: -90.255487 Datum: WGS 1984

Soil Map Unit Name: Lily-Lonewood complex, 5 to 12 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 16

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP29-UP14

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	20	No	FACU
2. *Rubus sp.*	40	Yes	
3. *Solidago altissima*	5	No	FACU
4. *Festuca heterophylla*	40	Yes	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105 =Total Cover		
50% of total cover: 53	20% of total cover: 21		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	40	x 5 =	200
Column Totals:	65 (A)		300 (B

Prevalence Index = B/A = 4.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP29-UP14

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/4	100					Sandy	Resistance at 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP35-UP17

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 5-10

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.763234 Long: -90.252169 Datum: WGS 1984

Soil Map Unit Name: Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 16

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP35-UP17

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Pycnanthemum albescens*	20	Yes	FACU
2. *Rubus sp.*	40	Yes	
3. *Solidago altissima*	5	No	FACU
4. *Ambrosia acanthicarpa*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1. *Pueraria lobata*	10	Yes	UPL
2.			
3.			
4.			
5.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	5	x 5 =	25
Column Totals:	30 (A)		125 (B

Prevalence Index = B/A = 4.17

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP35-UP17

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/4	100					Sandy	Resistance at 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/17/2022

Applicant/Owner: TVA State: TN Sampling Point: DP37-UP18

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10-15

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.747269 Long: -90.098981 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
25ft north of W3CPEM. On the edge of the right of way.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP37-UP18

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liriodendron tulipifera*	15	Yes	FACU
2. *Carya tomentosa*	15	Yes	UPL
3. *Liquidambar styraciflua*	15	Yes	FAC
4.			
5.			
6.			
7.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover:	9
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Quercus alba*	10	Yes	FACU
2. *Juniperus virginiana*	5	Yes	FACU
3. *Pinus taeda*	5	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4
Herb Stratum (Plot size: 5ft)			
1. *Rubus sp.*	30	Yes	
2. *Andropogon virginicus*	15	Yes	FACU
3. *Verbesina alternifolia*	5	No	FAC
4. *Verbascum thapsus*	5	No	FACU
5. *Dichanthelium clandestinum*	5	No	FAC
6. *Poaceae sp.*	5	No	
7.			
8.			
9.			
10.			
11.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	50	x 4 =	200
UPL species	15	x 5 =	75
Column Totals:	95 (A)		365 (B)

Prevalence Index = B/A = 3.84

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Half the upland plot is wooded

SOIL

Sampling Point: DP37-UP18

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/4						Sandy	Texture is fine sandy loam with gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
the soil was very dry

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP41-UP20

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 6-10

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.748100 Long: -90.096811 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point is in transmission line right of way.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: _____

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Elaeagnus umbellata*	20	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 5ft)			
1. *Rubus sp.*	60	Yes	
2. *Solidago sp.*	10	No	
3. *Phytolacca americana*	5	No	FACU
4. *Dichanthelium clandestinum*	5	No	FAC
5. *Juncus tenuis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1. *Vitis rotundifolia*	30	Yes	FAC
2.			
3.			
4.			
5.			
	30 =Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	5	x 4 =	20
UPL species	20	x 5 =	100
Column Totals:	65 (A)		240 (B)

Prevalence Index = B/A = 3.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: _____

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 5/4	100					Loamy/Clayey	Clay silty loam texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP43-UP21

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 4-6

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.748313 Long: -90.096138 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
West of W9C PEM. Area is dry.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP43-UP21

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Elaeagnus umbellata*	15	Yes	UPL
2. *Fraxinus sp.*	2	No	
3. *Prunus sp.*	2	No	
4.			
5.			
6.			
7.			
8.			
9.			
	19 =Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 5ft)			
1. *Solidago sp.*	40	Yes	
2. *Rubus sp.*	30	Yes	
3. *Verbascum thapsus*	10	No	FACU
4. *Plantago lanceolata*	10	No	UPL
5. *Allium canadense*	5	No	FACU
6. *Lunaria sp.*	5	No	
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	25	x 5 =	125
Column Totals:	40 (A)		185 (B)

Prevalence Index = B/A = 4.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP43-UP21

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/4	100					Loamy/Clayey	Loam Texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soil was dry and pliable. At 14 inches, the soil was unable to be pulled out of the plug due to its crumbly texture.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21

Applicant/Owner: TVA State: TN Sampling Point: DP45-UP22

Investigator(s): J Mace Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 4-6

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.748531 Long: -90.095745 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

West of W8C PEM

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP45-UP22

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Rubus sp.*	20	Yes	
2. *Liquidambar styraciflua*	2	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	22 =Total Cover		
50% of total cover: 11	20% of total cover: 5		
Herb Stratum (Plot size: 5ft)			
1. *Fescue sp.*	40	Yes	
2. *Lespedeza cuneata*	30	Yes	FACU
3. *Plantago lanceolata*	10	No	UPL
4. *Leucanthemum vulgare*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	2	x 3 =	6
FACU species	30	x 4 =	120
UPL species	15	x 5 =	75
Column Totals:	47 (A)		201 (B)

Prevalence Index = B/A = 4.28

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP45-UP22

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					Loamy/Clayey	Loam Texture, Dry and Pliable
4-16	10YR 5/4	100					Loamy/Clayey	Loam Texture, Dry and Pliable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/21

Applicant/Owner: TVA State: TN Sampling Point: DP47-UP23

Investigator(s): J Mace Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 4-6

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: Long: Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

West of PEM

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches):

Water Table Present? Yes No Depth (inches):

Saturation Present? Yes No Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP47-UP23

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1. *Rubus sp.*	20	Yes	
2. *Liquidambar styraciflua*	2	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	22 =Total Cover		
50% of total cover: 11	20% of total cover: 5		
Herb Stratum (Plot size: 5ft)			
1. *Fescue sp.*	40	Yes	
2. *Lespedeza cuneata*	30	Yes	FACU
3. *Plantago lanceolata*	10	No	UPL
4. *Leucanthemum vulgare*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
50% of total cover: 43	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	2	x 3 =	6
FACU species	30	x 4 =	120
UPL species	15	x 5 =	75
Column Totals:	47 (A)		201 (B)

Prevalence Index = B/A = 4.28

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP47-UP23

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					Loamy/Clayey	Loam Texture, Dry and Pliable
4-16	10YR 5/4	100					Loamy/Clayey	Loam Texture, Dry and Pliable

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP49-UP24

Investigator(s): J Mace Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.749031 Long: -90.094088 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP49-UP24

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 5ft)			
1. *Festuca sp.*	60	Yes	
2. *Plantago lanceolata*	10	No	UPL
3. *Onopordum acaulon*	5	No	FAC
4. *Trifolium repens*	20	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48		20% of total cover: 19	
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	10	x 5 =	50
Column Totals:	30 (A)		130 (B)

Prevalence Index = B/A = 4.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Area was recently mowed

SOIL

Sampling Point: DP49-UP24

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/3	95	10YR 5/8	5	C	M	Loamy/Clayey	Prominent redox concentrations
								Silt Loam Texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)

Project/Site: Kingston EIS TL Survey City/County: Roane County Sampling Date: 06/20/2022

Applicant/Owner: TVA State: TN Sampling Point: DP53-UP26

Investigator(s): J Mace, B Hartshorn Section, Township, Range:

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR N, MLRA 128 Lat: 34.749395 Long: -90.092776 Datum: NAD83

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
West of W4C PEM. NWI is showing a pond present, but there is not one. Fill dirt present indicates that the pond may have been filled in. The soil is a mixed matrix in the top 18 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP53-UP26

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5ft)			
1. *Plantago lanceolata*	5	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		
Woody Vine Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	5 (A)		25 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Area is sparcely vegetated.

SOIL

Sampling Point: DP53-UP26

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/3	50	10YR 6/1	25			Loamy/Clayey	Texture is silt loam
			10YR 5/8	25				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

There is a mixed matrix in the soil profile down to 18 inches and there are indications of fill dirt.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/23/2022

Applicant/Owner: TVA State: TN Sampling Point: DP62-UP30

Investigator(s): L.Thiem and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.751876 Long: -90.075648 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 46

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP62-UP30

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Juniperus virginiana*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5	=Total Cover	
50% of total cover:	3	20% of total cover:	1
Herb Stratum (Plot size: 5)			
1. *Solidago altissima*	30	Yes	FACU
2. *Verbesina alternifolia*	20	Yes	FAC
3. *Lespedeza cuneata*	10	No	FACU
4. *Rubus sp.*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65	=Total Cover	
50% of total cover:	33	20% of total cover:	13
Woody Vine Stratum (Plot size:)			
1. *Pueraria lobata*	5	Yes	UPL
2.			
3.			
4.			
5.			
	5	=Total Cover	
50% of total cover:	3	20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	45	x 4 =	180
UPL species	0	x 5 =	0
Column Totals:	65 (A)		240 (B

Prevalence Index = B/A = 3.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP62-UP30

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/4	95	7.5YR 5/8	5	C	M	Loamy/Clayey	Restrictive at 12 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP71-UP35

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.980976° Long: -84.334151° Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
UPLAND POINT IN HYDRIC SOIL NEAR BLUE LINE STREAM THAT WAS CULVERTED

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
WETLAND HYDROLOGY IS NOT PRESENT

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP71-UP35

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	40	Yes	FACU
2. *Acer rubrum*	20	Yes	FAC
3. *Prunus serotina*	15	Yes	FACU
4.			
5.			
6.			
7.			
	75	=Total Cover	
50% of total cover: 38	20% of total cover: 15		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size:)			
1. *Grass sp.*	60	Yes	
2. *Poa pratensis*	10	No	
3. *Potentilla indica*	10	No	
4. *Taraxacum*	5	No	
5. *Trifolium repens*	10	No	
6.			
7.			
8.			
9.			
10.			
11.			
	95	=Total Cover	
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	75 (A)		280 (B

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP71-UP35

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100						SILTY LOAM
4-12	10YR 4/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP75-UP36

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 5-10

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.758915 Long: -90.066278 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken upslope of W36. This point was previosuly mapped as hydric pfo wetland

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP75-UP36

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	20	Yes	FACU
2. *Platanus occidentalis*	10	No	FACW
3. *Liriodendron tulipifera*	20	Yes	FACU
4. *Carpinus caroliniana*	5	No	FAC
5.			
6.			
7.			
	55	=Total Cover	
50% of total cover: 28	20% of total cover: 11		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Ligustrum sinense*	15	Yes	FACU
2. *Acer saccharum*	10	Yes	FACU
3. *Lindera benzoin*	10	Yes	FAC
4. *Carpinus caroliniana*	5	No	FAC
5. *Rosa multiflora*	10	Yes	FACU
6.			
7.			
8.			
9.			
	50	=Total Cover	
50% of total cover: 25	20% of total cover: 10		
Herb Stratum (Plot size: 5)			
1. *Toxicodendron radicans*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	=Total Cover	
50% of total cover: 10	20% of total cover: 4		
Woody Vine Stratum (Plot size:)			
1. *Lonicera japonica*	5	Yes	UPL
2. *Parthenocissus quinquefolia*	10	Yes	FACU
3.			
4.			
5.			
	15	=Total Cover	
50% of total cover: 8	20% of total cover: 3		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 22.2% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	40	x 3 =	120
FACU species	85	x 4 =	340
UPL species	5	x 5 =	25
Column Totals:	140 (A)		505 (B)

Prevalence Index = B/A = 3.61

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) o more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP75-UP36

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Loamy/Clayey	
10-20	7.5YR 4/6	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP77-UP37

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.759585 Long: -90.065136 Datum: WGS 1984

Soil Map Unit Name: Chenneby silt loam, frequently flooded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland point taken upslope of W40.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP77-UP37

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 5)			
1. *Rubus sp.*	15	Yes	FACU
2. *Lolium perenne*	20	Yes	FACU
3. *Vicia sativa*	20	Yes	FACU
4. *Solidago altissima*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13
Woody Vine Stratum (Plot size:)			
1. *Lonicera japonica*	10	Yes	UPL
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	65	x 4 =	260
UPL species	10	x 5 =	50
Column Totals:	75 (A)		310 (B

Prevalence Index = B/A = 4.13

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP77-UP37

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					Loamy/Clayey	
4-20	2.5Y 5/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP79-UP38

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.960537 Long: -84.352802 Datum: WGS 1984

Soil Map Unit Name: Chenneby silt loam, frequently flooded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland point taken upslope of W40.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP79-UP38

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Rubus sp.*	40	Yes	FACU
2. *Toxicodendron radicans*	5	No	FAC
3. *Verbesina alternifolia*	10	No	FAC
4. *Microstegium vimineum*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
50% of total cover: 30	20% of total cover: 12		
Woody Vine Stratum (Plot size:)			
1. *Lonicera japonica*	10	Yes	UPL
2.			
3.			
4.			
5.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	40	x 4 =	160
UPL species	10	x 5 =	50
Column Totals:	70 (A)		270 (B

Prevalence Index = B/A = 3.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP79-UP38

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 4/3	100					Loamy/Clayey	Silty
15-20	10YR 4/4	100					Loamy/Clayey	Silty

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP77-UP37

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.759209 Long: -90.065466 Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
UPSLOPE OF WETLAND 3, DENSELY VEGETATED

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
WETLAND HYDROLOGY IS NOT PRESENT

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP77-UP37

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size:)			
1. *Verbesina alternifolia*	15	No	
2. *Dichanthelium clandestinum*	10	No	
3. *Toxicodendron radicans*	30	Yes	
4. *Ambrosia*	10	No	
5. *Rubus idaeus*	20	Yes	
6. *Lonicera japonica*	5	No	FACU
7. *Carex alopecoidea*	5	No	FACW
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	10 (A)		30 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP77-UP37

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	100						SILTY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/8/2022

Applicant/Owner: TVA State: TN Sampling Point: DP83- UP4(

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.767163 Long: -90.262337 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken near W41

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP83- UP40

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer negundo*	10	Yes	FAC
2. *Acer rubrum*	5	Yes	FAC
3. *Celtis occidentalis*	5	Yes	FACU
4. *Tilia americana*	5	Yes	FACU
5.			
6.			
7.			
	25	=Total Cover	
50% of total cover: 13		20% of total cover:	5
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer negundo*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5	=Total Cover	
50% of total cover: 3		20% of total cover:	1
Herb Stratum (Plot size: 5)			
1. *Rubus sp.*	5	Yes	FACU
2. *Microstegium vimineum*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2
Woody Vine Stratum (Plot size:)			
1. *Vitis rotundifolia*	5	Yes	FAC
2. *Vitis aestivalis*	5	Yes	FACU
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 55.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	50 (A)		170 (B

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP83- UP40

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					Loamy/Clayey	Silty
4-20	10YR 4/6	100					Loamy/Clayey	Silty

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP88-UP43

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 36.002308° Long: -84.263226° Datum: WGS 1984

Soil Map Unit Name: Chenneby silt loam, frequently flooded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present.

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP85-UP41

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE Slope (%): 2-5

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.766048 Long: -84.334151° Datum: WGS 1984

Soil Map Unit Name: Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
UPLAND POINT IN HYDRIC SOIL NEAR BLUE LINE STREAM

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
WETLAND HYDROLOGY IS NOT PRESENT

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP85-UP41

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	40	Yes	FACU
2. *Acer rubrum*	20	Yes	FAC
3. *Prunus serotina*	15	Yes	FACU
4.			
5.			
6.			
7.			
	75	=Total Cover	
50% of total cover: 38	20% of total cover: 15		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size:)			
1. *Grass sp.*	60	Yes	
2. *Poa pratensis*	10	No	
3. *Potentilla indica*	10	No	
4. *Taraxacum*	5	No	
5. *Trifolium repens*	10	No	
6.			
7.			
8.			
9.			
10.			
11.			
	95	=Total Cover	
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	75 (A)		280 (B

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP85-UP41

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100						SILTY LOAM
4-12	10YR 4/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

VEGETATION Four Strata – Use scientific names of plants.

Sampling Point: DP88-UP43

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Maple	30	Yes	
2. *Carya glabra*	10	No	FACU
3. *Ulmus americana*	10	No	FACW
4.			
5. *Acer negundo*	5	No	FAC
6.			
7.			
	55	=Total Cover	
50% of total cover: 28		20% of total cover:	11
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer negundo*	20	Yes	FAC
2. Red Maple	15	Yes	
3. *Carya*	5	No	
4.			
5.			
6.			
7.			
8.			
9.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover:	8
Herb Stratum (Plot size: 5)			
1. *Impatiens capensis*	20	Yes	
2. *Solidago altissima*	40	Yes	FACW
3. *Toxicodendron radicans*	20	Yes	
4. *Juncus effusus*	10	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover:	18
Woody Vine Stratum (Plot size:)			
1. *Lonicera*	10	Yes	
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	25	x 3 =	75
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	85 (A)		215 (B)

Prevalence Index = B/A = 2.53

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP88-UP43

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100						SILTY LOAM
3-20	10YR 4/3	100						SILTY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- x Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
MANGANESE PIECES WITHIN SOIL

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/6/2022

Applicant/Owner: TVA State: TN Sampling Point: DP92-UP45

Investigator(s): L.Thiem, J. Calderon-Brandt, and B. Eden Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 35.999474° Long: -84.258 Datum: WGS 1984

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:
Depressional area within TVA ROW, mapped hydric layer, Disturbed ROW

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present.

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP92-UP45

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus*	20	Yes	
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover:	4	
Herb Stratum (Plot size: 5)			
1. *Carex intumescens*	5	No	
2. *Juncus effusus*	30	Yes	FACW
3. *Ambrosia*	20	Yes	
4. *Oligoneuron*	10	No	
5. *Scirpus cyperinus*	5	No	
6. *Asclepias*	5	No	
7. *Dichanthelium clandestinum*	5	No	FAC
8.			
9.			
10.			
11.			
	80 =Total Cover		
50% of total cover: 40	20% of total cover:	16	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	35 (A)		75 (B

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP92-UP45

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 4/3	97			C	M	Loamy/Clayey	SILTY LOAM
	7.5YR 4/6	3						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/23/2022

Applicant/Owner: TVA State: TN Sampling Point: DP95-UP47

Investigator(s): L.Thiem and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.752019 Long: -90.059031 Datum: WGS 1984

Soil Map Unit Name: Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Upland point taken uplsope of wetland 46

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP95-UP47

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus sp.*	10	Yes	
2. *Juniperus virginiana*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	15	=Total Cover	
50% of total cover:	8	20% of total cover:	3
Herb Stratum (Plot size: 5)			
1. *Festuca arundinacea*	20	Yes	FACU
2. *Alopecurus aequalis*	10	Yes	FAC
3. *Trifolium pratense*	5	No	FACU
4. *Solidago altissima*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	=Total Cover	
50% of total cover:	20	20% of total cover:	8
Woody Vine Stratum (Plot size:)			
1. *Pueraria lobata*	20	Yes	UPL
2.			
3.			
4.			
5.			
	20	=Total Cover	
50% of total cover:	10	20% of total cover:	4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	45 (A)		170 (B

Prevalence Index = B/A = 3.78

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP95-UP47

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 5/3	80	2.5Y 5/6	20	C	M	Loamy/Clayey	Resistance at 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/15/2022

Applicant/Owner: TVA State: TN Sampling Point: DP97-UP48

Investigator(s): L.Thiem and G. Reinsfelder Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 5-10

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.751959 Long: -90.056386 Datum: WGS 1984

Soil Map Unit Name: Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 47

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP97-UP48

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus sp.*	10	Yes	
2. *Juniperus virginiana*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	15 =Total Cover		
50% of total cover: 8	20% of total cover: 3		
Herb Stratum (Plot size: 5)			
1. *Pycnanthemum albescens*	5	No	FACU
2. *Rubus sp.*	10	No	
3. *Solidago altissima*	20	Yes	FACU
4. *Lespedeza cuneata*	30	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1. *Pueraria lobata*	20	Yes	UPL
2.			
3.			
4.			
5.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	60 (A)		240 (B

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP97-UP48

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/4	100					Sandy	Resistance at 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

WETLAND DETERMINATION DATA SHEET ï Eastern Mountains and Piedmont Region

Project/Site: Kingston EIS City/County: Oak Ridge/ Kingston Sampling Date: 6/24/2022

Applicant/Owner: TVA State: TN Sampling Point: DP99-UP49

Investigator(s): L.Thiem and L. Hue Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): CONCAVE Slope (%): 2-4

Subregion (LRR or MLRA): LRR N, MLRA 125 Lat: 34.755682 Long: -90.050967 Datum: WGS 1984

Soil Map Unit Name: NOTCOM NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS ï Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point taken uplsope of wetland 48

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present

VEGETATION Four Strata – Use scientific names of plants. Sampling Point: DP99-UP49

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Lespedeza cuneata*	20	Yes	FACU
2. *Poaceae sp.*	20	Yes	
3. *Daucus carota*	10	No	UPL
4. *Aster sp.*	5	No	
5. *Sorghum halepense*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
50% of total cover: 30	20% of total cover: 12		
Woody Vine Stratum (Plot size:)			
1. *Pueraria lobata*	20	Yes	UPL
2.			
3.			
4.			
5.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	10	x 5 =	50
Column Totals:	35 (A)		150 (B

Prevalence Index = B/A = 4.29

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must b present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) c more in diameter at breast height (DBH), regardless o height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland vegetation is not present

SOIL

Sampling Point: DP99-UP49

Profile Description: Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 5/3	80	2.5Y 5/6	20	C	M	Loamy/Clayey	Resistance at 8 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 148)**
- ___ Red Parent Material (F21) **MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **MLRA 147)**
- ___ Coast Prairie Redox (A16) **MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **MLRA 136, 147)**
- ___ Red Parent Material (F21) **outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer if observed :

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soils are not present

TDEC TRAM Dataforms

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W1

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W1

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 14.00

PID

W1

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W1

KIF Retirement

W1

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

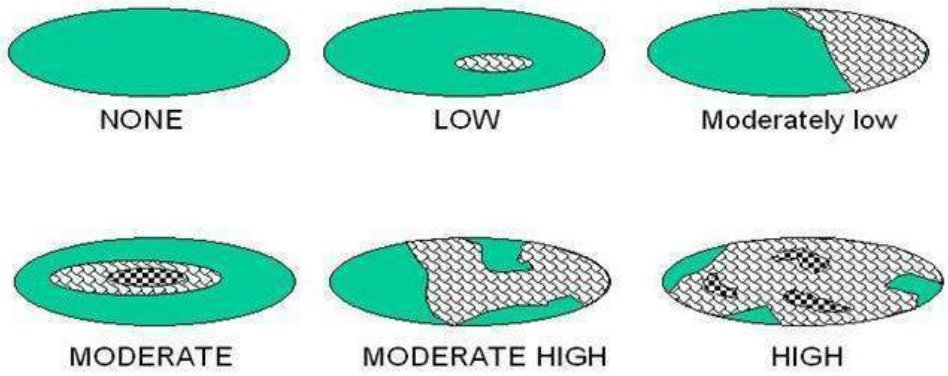

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	14
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	40

KIF Retirement

PID

W1

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W2
6/14/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W2

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W2

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	7
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 14.00

PID

W2

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W2

KIF Retirement

W2

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt LOW Wetland has a low degree of interspersion.	
0pt NONE Wetland has no plan view interspersion	

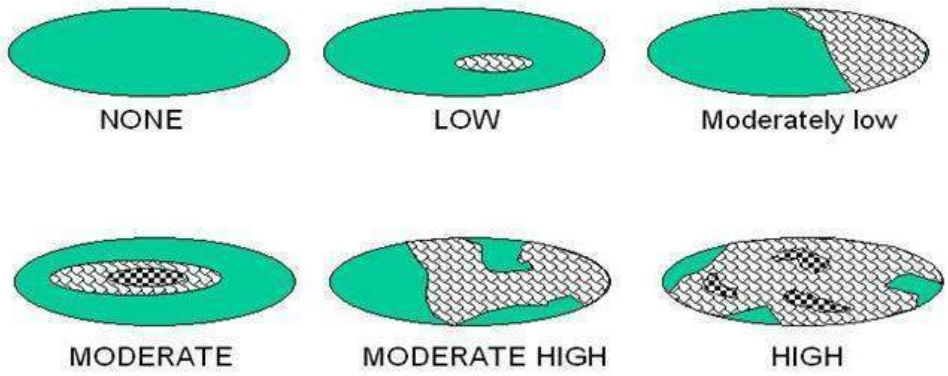

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	14
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	39

KIF Retirement

PID

W2

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W3

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W3

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 9.00

PID

W3

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W3

KIF Retirement

W3

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 9

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

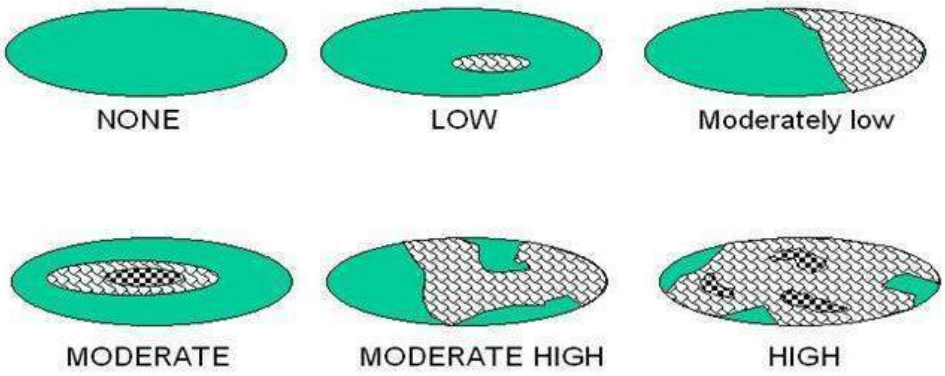

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	9
	Metric 4: Habitat	9
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	26

KIF Retirement

PID

W3

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W4
6/16/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W4

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W4

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) Pasture

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 16.00

PID

W4

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading __x__plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	4.0
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 4.00

KIF Retirement PID W4

KIF Retirement

W4

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 10

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

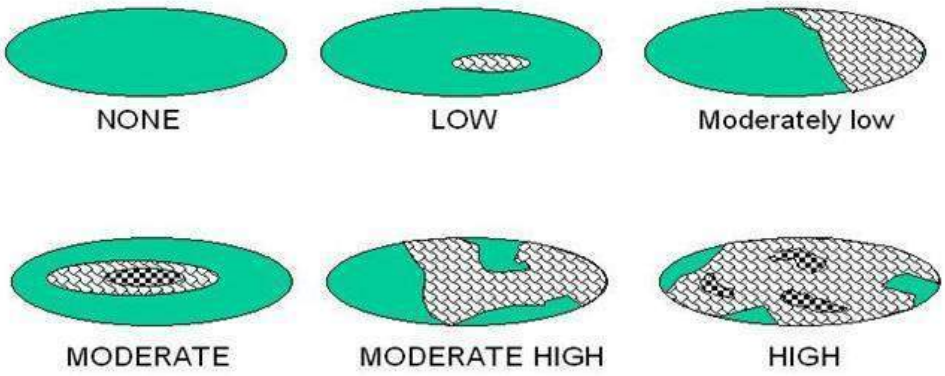

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	16
	Metric 4: Habitat	10
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	36

KIF Retirement

PID

W4

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W5

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W5

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 24.00

PID

W5

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4.0
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement

W5

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	9.0
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 9.00

Metric 4 Total 16

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

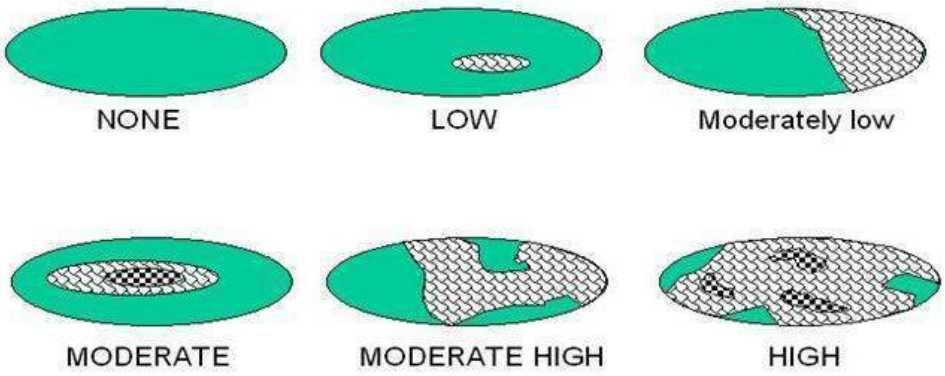

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	24
	Metric 4: Habitat	16
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	55

KIF Retirement

PID

W5

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
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10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W6

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W6

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) grazing

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 11.00

PID

W6

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.00
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement

W6

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	1.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

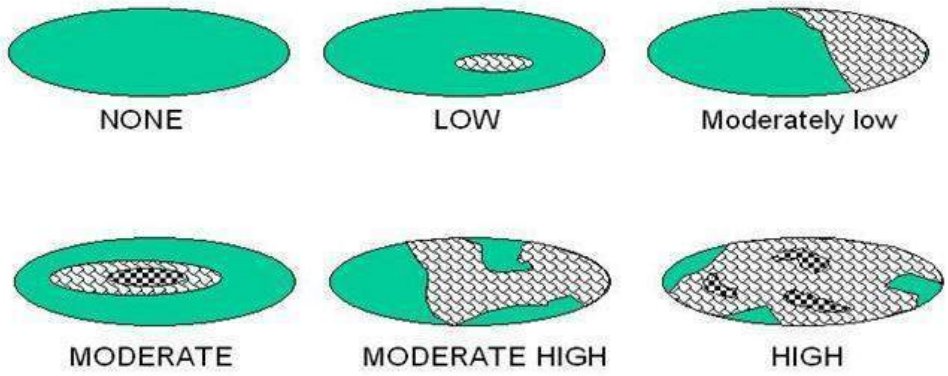

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

2

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	11
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	27

KIF Retirement

PID

W6

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W7

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W7

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) grazing

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 8.00

PID

W7

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.00
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W7

KIF Retirement

W7

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 11

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	3.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

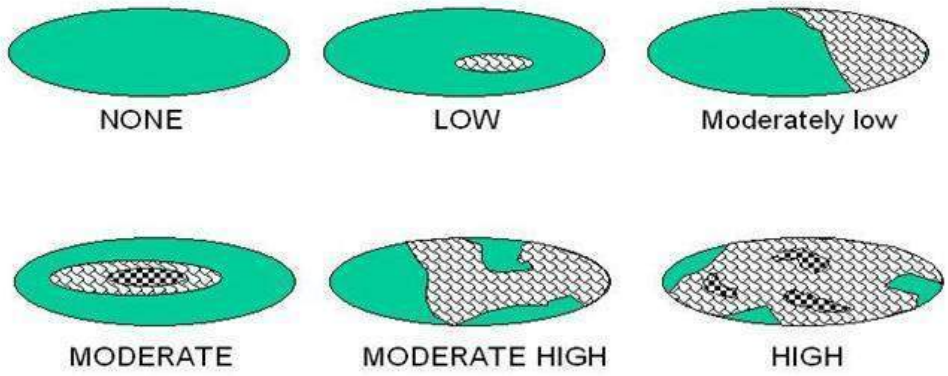

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	8
	Metric 4: Habitat	11
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	28

KIF Retirement

PID

W7

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W8

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W8

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) grazing

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 8.00

PID

W8

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.00
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W8

KIF Retirement

W8

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 11

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
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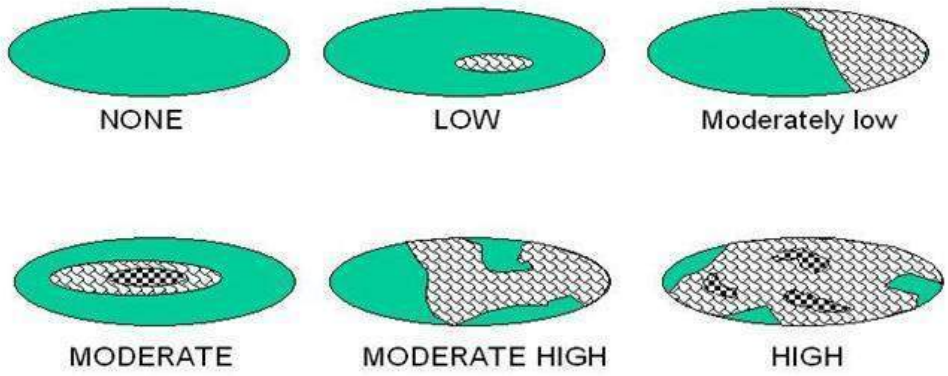
6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	



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6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
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3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	8
	Metric 4: Habitat	11
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	28

KIF Retirement

PID

W8

Rank = Low

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Quantitative Rating

Tennessee Rapid Assessment Method

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6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W9

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W9

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) mowing

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 13.00

PID

W9

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) _x_vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W9

KIF Retirement

W9

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 9

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

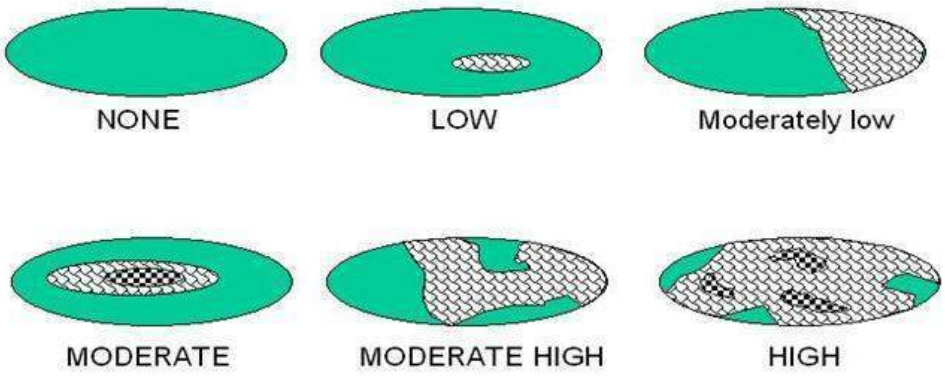

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 3

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	13
	Metric 4: Habitat	9
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	36

KIF Retirement

PID

W9

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W10
6/14/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W10

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 3.00

KIF Retirement

PID

W10

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 9.00

PID

W10

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2.0
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 2.00

KIF Retirement PID W10

KIF Retirement

W10

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 11

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

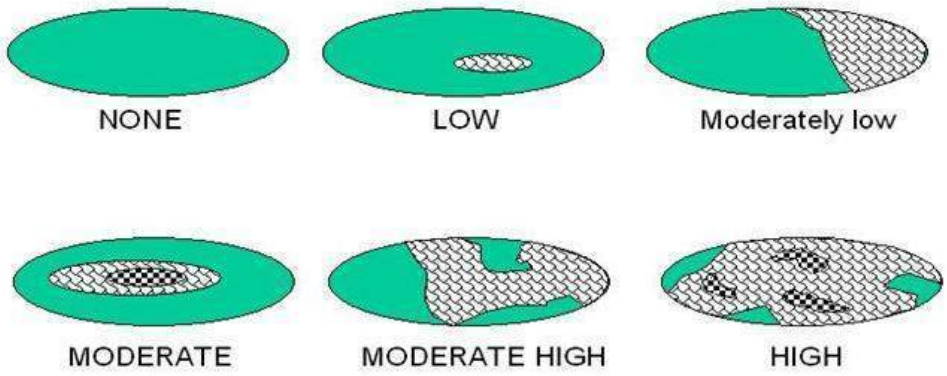

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 1

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	9
	Metric 4: Habitat	11
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	28

KIF Retirement

PID

W10

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W11
6/14/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	6
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 6

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W11

Metric 2 Total 12.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 4.00

KIF Retirement

PID

W11

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) grazing

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 28.00

PID

W11

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4.0
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	6.0
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 6.00

KIF Retirement

W11

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	9.0
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 9.00

Metric 4 Total 19

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	5.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

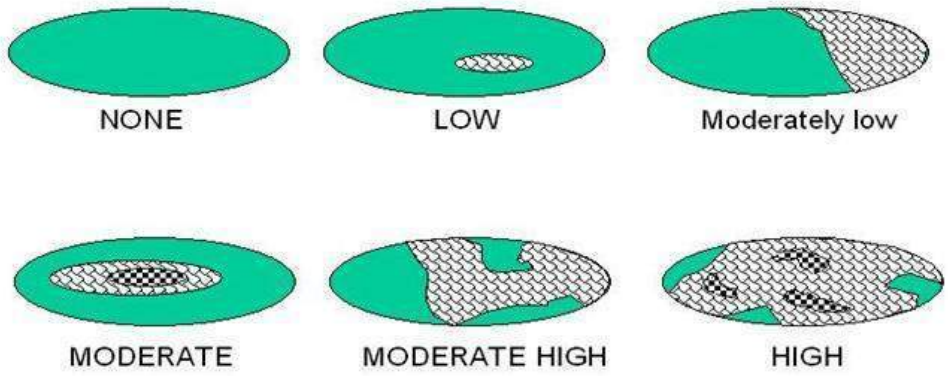

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	6
	Metric 2: Buffers and surrounding land use	12
	Metric 3: Hydrology	28
	Metric 4: Habitat	19
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	68

KIF Retirement

PID

W11

Rank = moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W12
6/15/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	3
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 3

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W12

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 4.00

KIF Retirement

PID

W12

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) hay pasture

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 20.00

PID

W12

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading __x__plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	5.0
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 5.00

KIF Retirement

W12

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 14

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

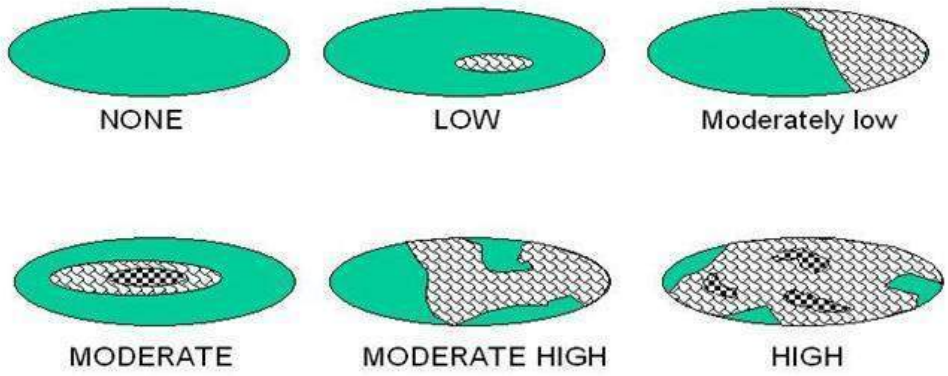

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	3

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 1

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	3
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	20
	Metric 4: Habitat	14
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	45

KIF Retirement

PID

W12

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W13

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W13

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)	X	other (specify) Cattle pasture

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	1

3e Avg= 1.00

KIF Retirement

Metric 3 Total 5.00

PID

W13

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing __x__grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1.0

4a Avg.= 1.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2.0
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 2.00

KIF Retirement PID W13

KIF Retirement

W13

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1.0

4c Avg. = 1.00

Metric 4 Total 4

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

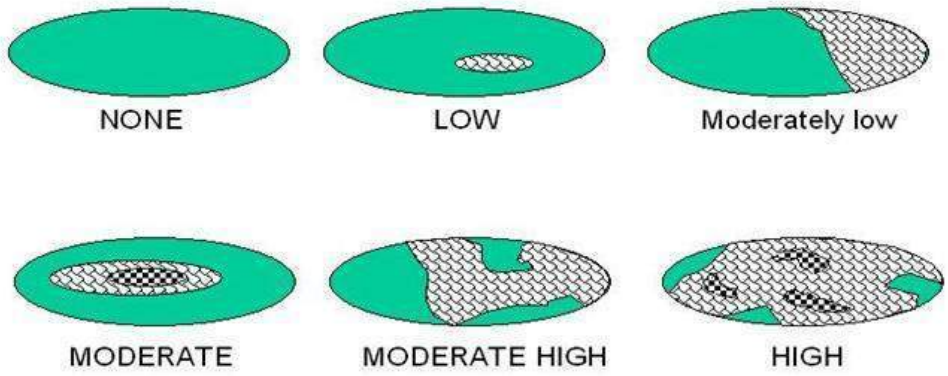

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	5
	Metric 4: Habitat	4
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	21

KIF Retirement

PID

W13

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W14
6/16/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	7
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 7.00

KIF Retirement

PID

W14

Metric 2 Total 11.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W14

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 12.00

PID

W14

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	4.0
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 4.00

KIF Retirement PID W14

KIF Retirement

W14

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
X	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

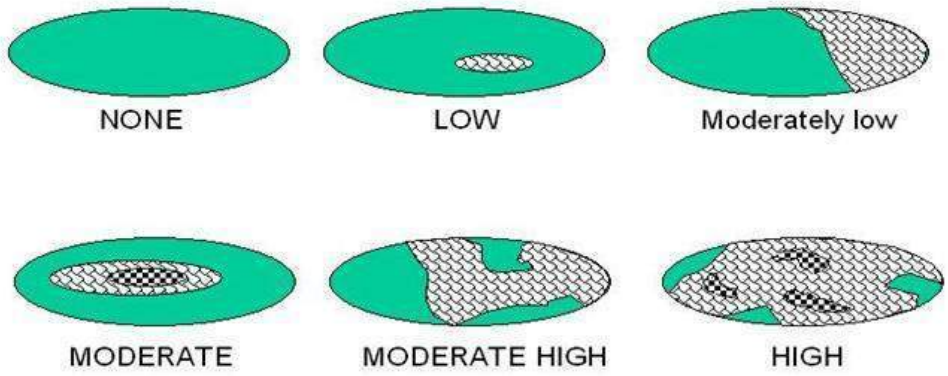

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	11
	Metric 3: Hydrology	12
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	40

KIF Retirement

PID

W14

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W15
6/15/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W15

Metric 2 Total 12.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 1.00

KIF Retirement

PID

W15

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 17.00

PID

W15

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4.0
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	5.0
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 5.00

KIF Retirement PID W15

KIF Retirement

W15

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 15

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

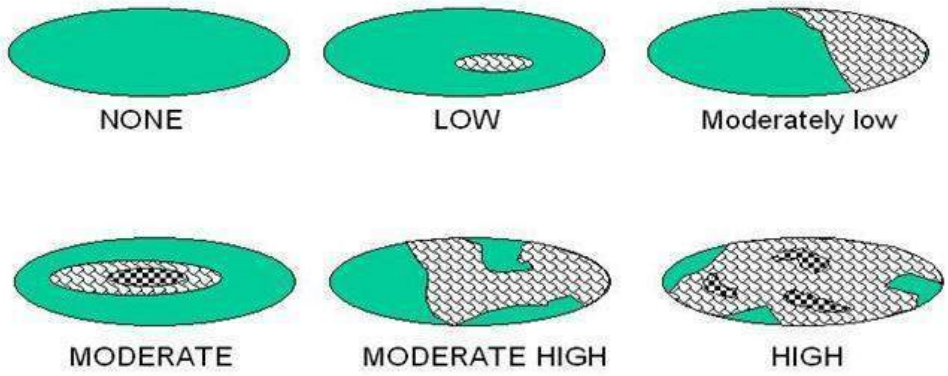

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	12
	Metric 3: Hydrology	17
	Metric 4: Habitat	15
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	44

KIF Retirement

PID

W15

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W16
6/15/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W16

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W16

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 11.00

PID

W16

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W16

KIF Retirement

W16

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

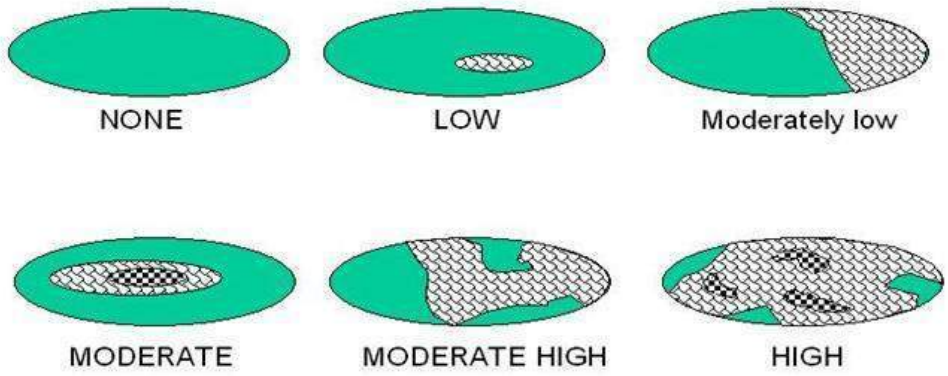

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	11
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	36

KIF Retirement

PID

W16

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
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10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

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Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID#39170

W017

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 21.00

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Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 2.00

KIF Retirement

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1
0pt NONE Wetland has no plan view interspersion	

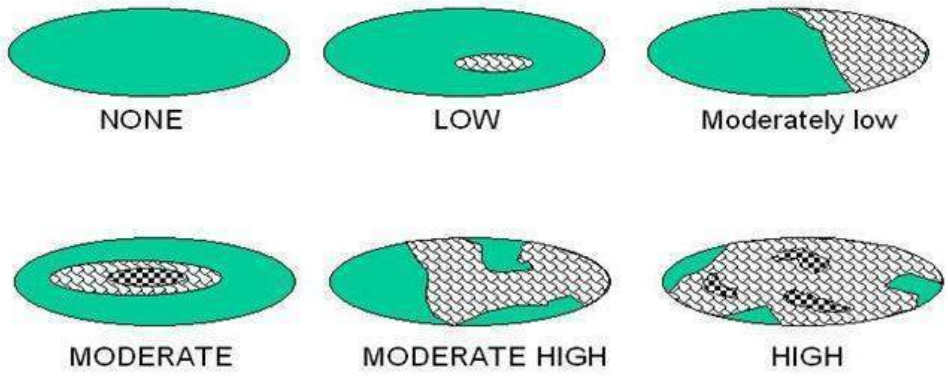

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	21
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	42

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Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	4
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 4

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

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Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 1.00

KIF Retirement

PID#39170

W018

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
X	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 19.00

PID#39170

W018

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	9
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 9.00

Metric 4 Total 16

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	2
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

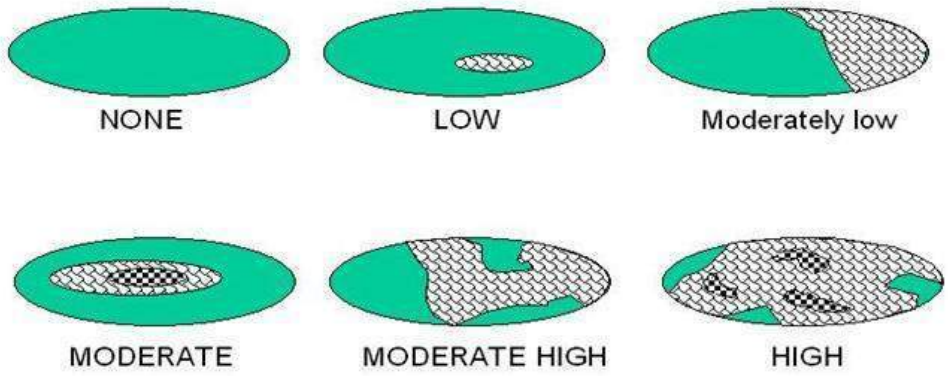

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	4
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	19
	Metric 4: Habitat	16
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	44

KIF Retirement

PID#39170

W018

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID#39170

W019

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID#39170

W019

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 21.00

PID#39170

W019

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 2.00

KIF Retirement

W019

PID#39170

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	1
0pt	NONE Wetland has no plan view interspersion	

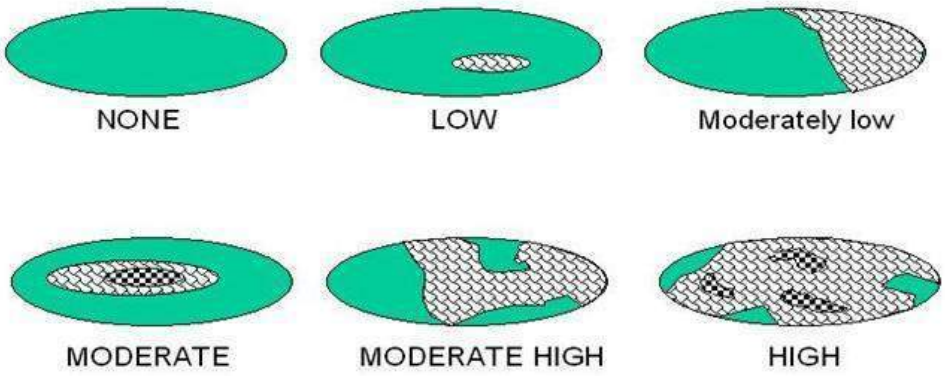

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 0

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	21
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	46

KIF Retirement

PID#39170

W019

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0

2a Avg.= 0.50

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 4.00

KIF Retirement

PID#39170

W020

Metric 2 Total 4.50

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID#39170

W020

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 14.00

PID#39170

W020

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement

W020

PID#39170

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 10

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1
0pt NONE Wetland has no plan view interspersion	

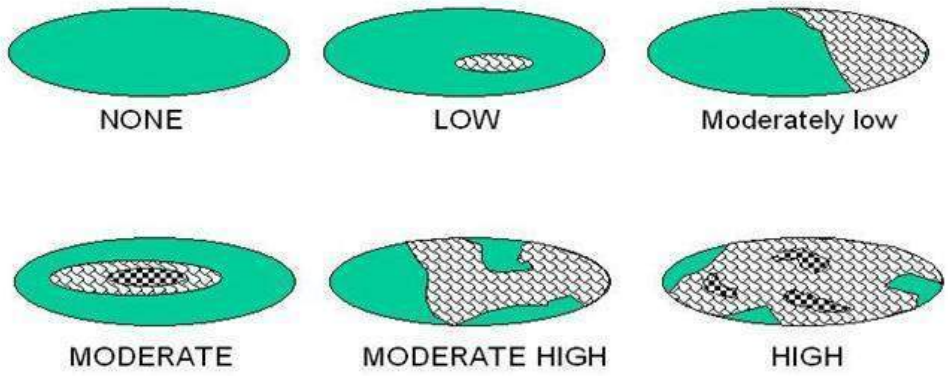

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4.5
	Metric 3: Hydrology	14
	Metric 4: Habitat	10
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	27

KIF Retirement

PID#39170

W020

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0

2a Avg.= 0.50

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID#39170

W021

Metric 2 Total 3.50

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID#39170

W021

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.00
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 11.00

PID#39170

W021

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	4
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 4.00

KIF Retirement

W021

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 11

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

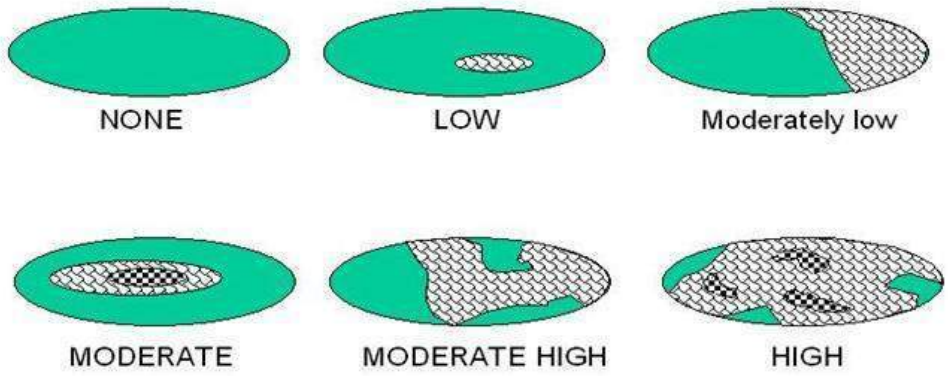

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	3.5
	Metric 3: Hydrology	11
	Metric 4: Habitat	11
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	32

KIF Retirement

PID#39170

W021

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID#39170

W022

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 4.00

KIF Retirement

PID#39170

W022

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 27.00

PID#39170

W022

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing x ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

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W022

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 5

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	2
1pt LOW Wetland has a low degree of interspersion.	
0pt NONE Wetland has no plan view interspersion	

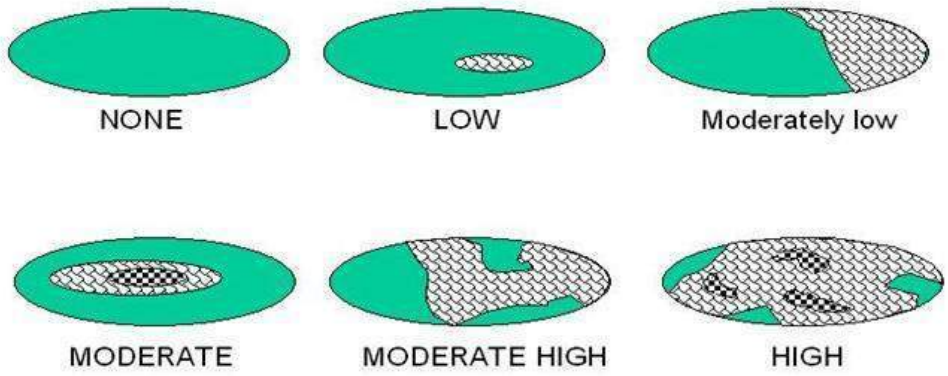

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	2

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	27
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	5
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	58

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Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0

2a Avg.= 0.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

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Metric 2 Total 3.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

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W023

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 16.00

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Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing x ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1

4a Avg.= 1.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1

4b Avg.= 1.00

KIF Retirement

W023

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1

4c Avg. = 1.00

Metric 4 Total 3

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1
0pt NONE Wetland has no plan view interspersion	

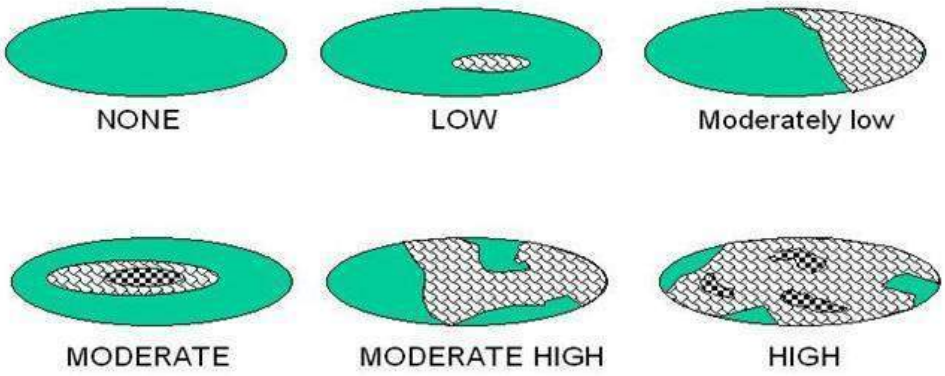

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 0

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	3
	Metric 3: Hydrology	16
	Metric 4: Habitat	3
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	25

KIF Retirement

PID#39170

W023

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0

2a Avg.= 0.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID#39170

W024

Metric 2 Total 3.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID#39170

W024

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 16.00

PID#39170

W024

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing x ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1

4a Avg.= 1.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1

4b Avg.= 1.00

KIF Retirement

W024

PID#39170

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1

4c Avg. = 1.00

Metric 4 Total 3

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
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6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
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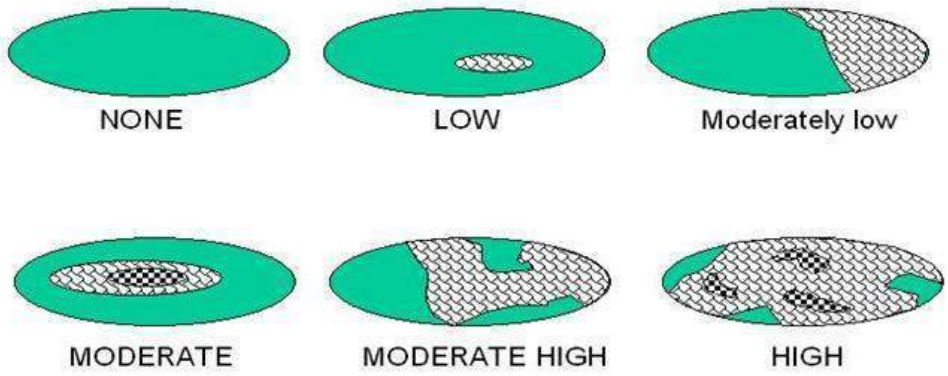
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1
0pt NONE Wetland has no plan view interspersion	



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-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 0

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	3
	Metric 3: Hydrology	16
	Metric 4: Habitat	3
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
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KIF Retirement

PID#39170

W024

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Quantitative Rating
Tennessee Rapid Assessment Method

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4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0

2a Avg.= 0.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID#39170

W025

Metric 2 Total 3.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	1
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID#39170

W025

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	1

3e Avg= 1.00

KIF Retirement

Metric 3 Total 5.00

PID#39170

W025

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _x___filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1

4a Avg.= 1.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1

4b Avg.= 1.00

KIF Retirement

W025

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
X	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1

4c Avg. = 1.00

Metric 4 Total 3

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1
0pt NONE Wetland has no plan view interspersion	

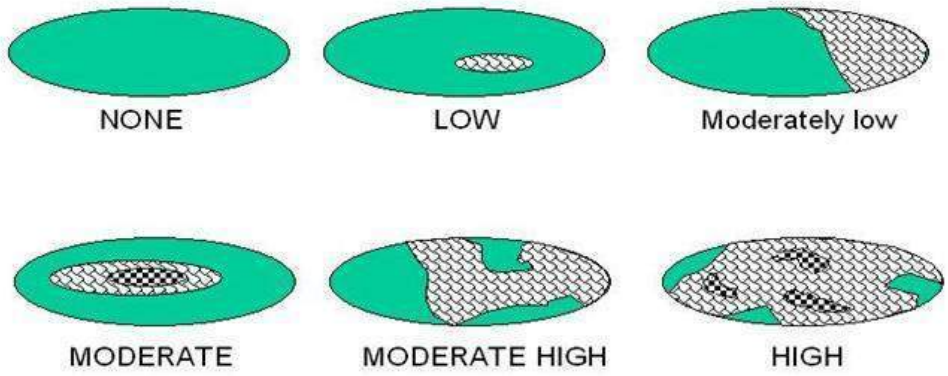

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 0

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	3
	Metric 3: Hydrology	5
	Metric 4: Habitat	3
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	14

KIF Retirement

PID#39170

W025

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W26

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W26

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 18.00

PID

W26

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement

W26

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
X	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	4.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

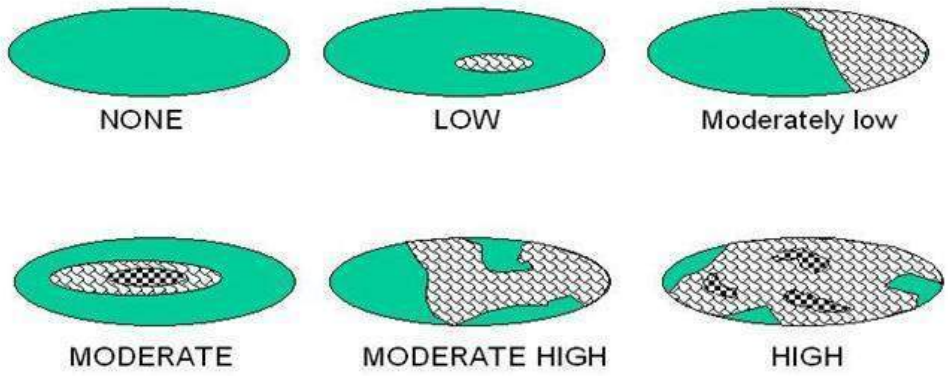

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	18
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	40

KIF Retirement

PID

W26

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W27
6/16/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W27

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W27

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland	X	filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 18.00

PID

W27

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	4.0
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 4.00

KIF Retirement PID W27

KIF Retirement

W27

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
X	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	4.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

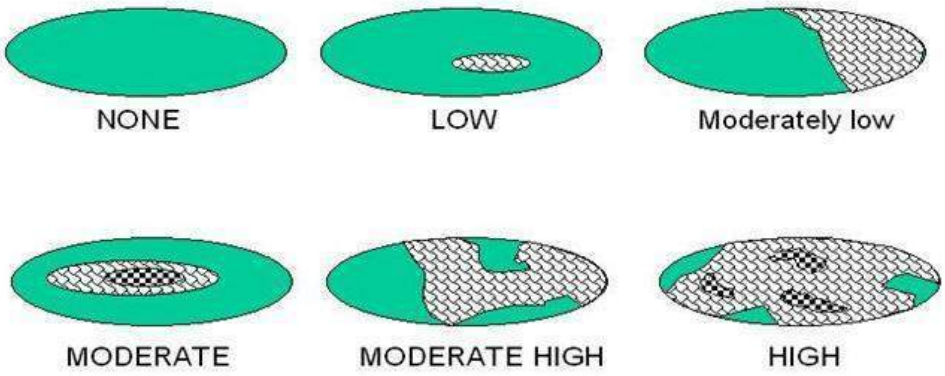

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	18
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	47

KIF Retirement

PID

W27

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	4
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 4

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W28

Metric 2 Total 12.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 4.00

KIF Retirement

PID

W28

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	12
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 12.00

KIF Retirement

Metric 3 Total 25.00

PID

W28

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	4.0
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 4.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	6.0
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 6.00

KIF Retirement

W28

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	9.0
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 9.00

Metric 4 Total 19

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools	5	5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5	5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches	10	10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 20

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	2.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	2.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	4.0
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

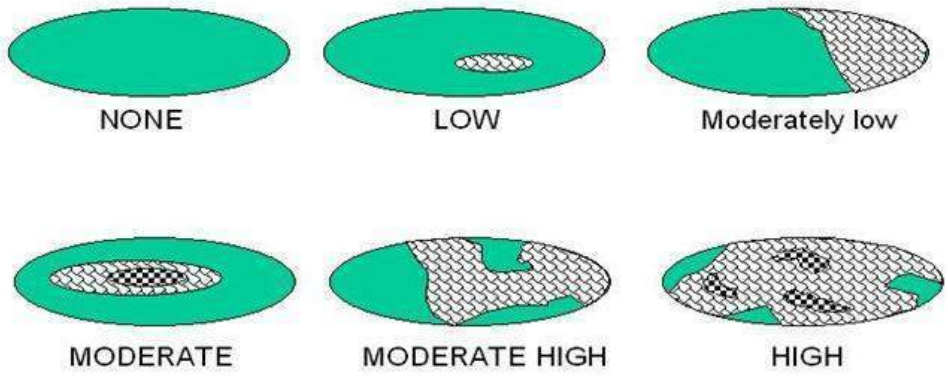

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	4
	Metric 2: Buffers and surrounding land use	12
	Metric 3: Hydrology	25
	Metric 4: Habitat	19
	Metric 5: Special Wetland Communities	20
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	83

KIF Retirement

PID

W28

Rank = Exceptional TN Water

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W29
6/22/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W29

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W29

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 3.00

KIF Retirement

Metric 3 Total 11.00

PID

W29

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1.0

4b Avg.= 1.00

KIF Retirement PID W29

KIF Retirement

W29

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 6

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

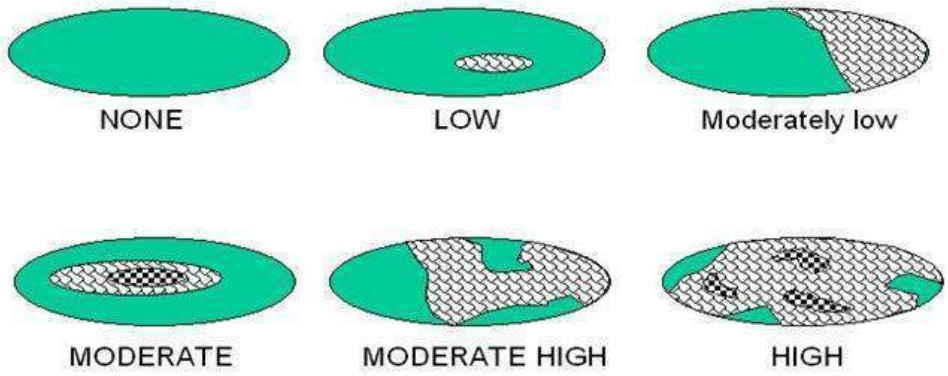

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	11
	Metric 4: Habitat	6
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	25

KIF Retirement

PID

W29

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W30

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W30

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W30

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
X	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 6

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	4.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

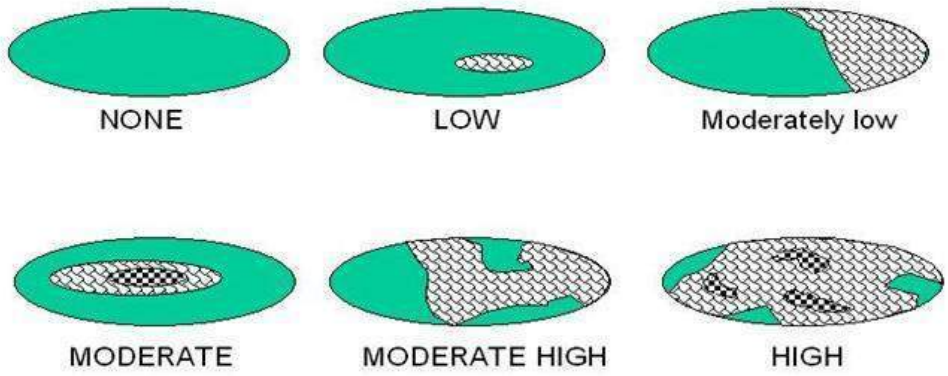

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	13
	Metric 4: Habitat	6
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	28

KIF Retirement

PID

W30

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W31
6/22/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W31

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W31

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W31

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
X	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 6

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	1.0
0pt	NONE Wetland has no plan view interspersion	

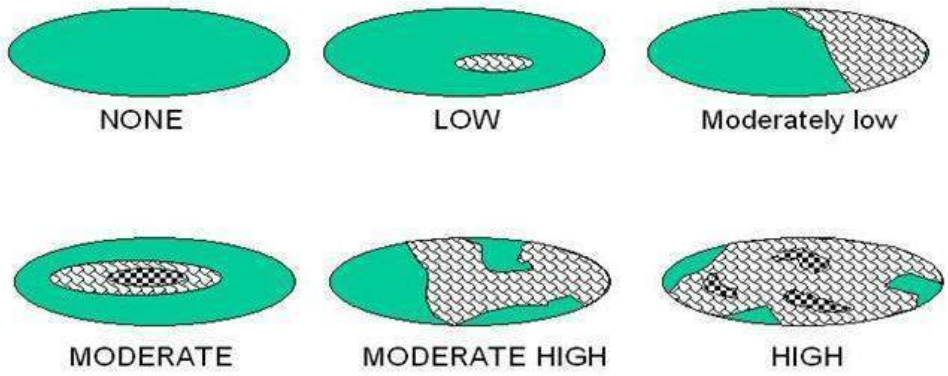

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	11
	Metric 4: Habitat	6
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	32

KIF Retirement

PID

W31

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W32
6/23/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W32

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W32

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W32

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 16

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	4.0
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

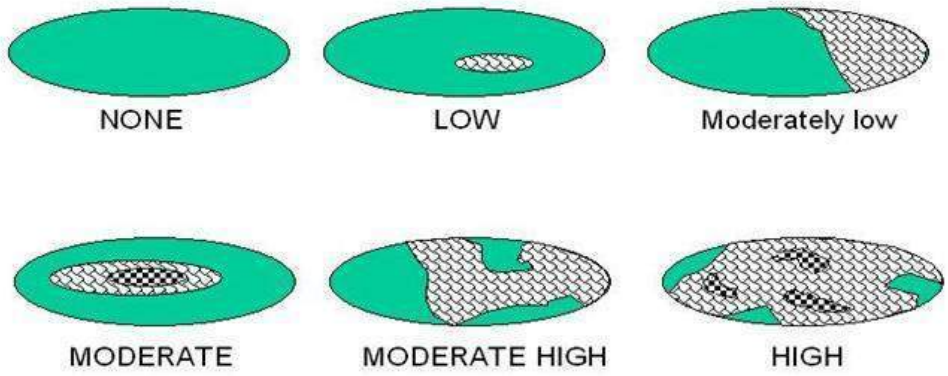

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	14
	Metric 4: Habitat	16
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	35

KIF Retirement

PID

W32

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W33
6/23/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
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10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W33

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

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3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

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4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 16

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	4.0
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

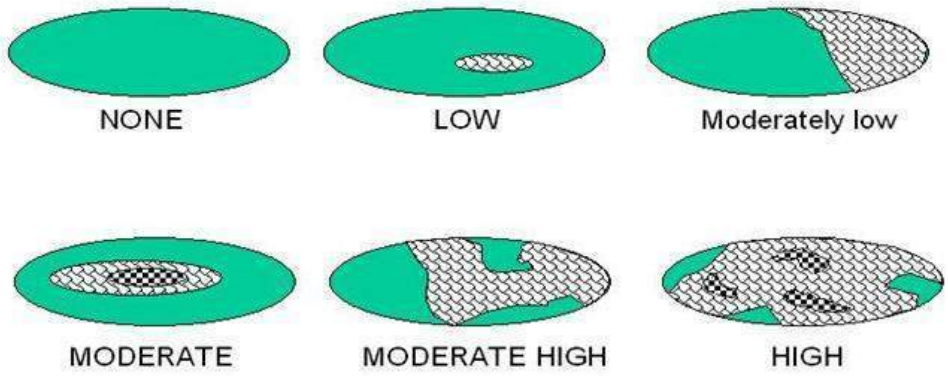

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	1
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 3

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	14
	Metric 4: Habitat	16
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	38

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Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

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Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

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3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W34

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 7

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

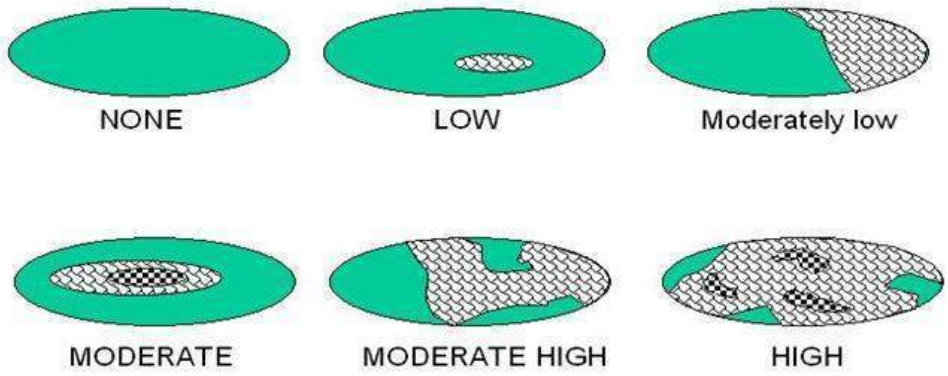

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	7
	Metric 4: Habitat	7
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	24

KIF Retirement

PID

W34

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W35
6/9/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W35

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W35

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W35

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 14

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

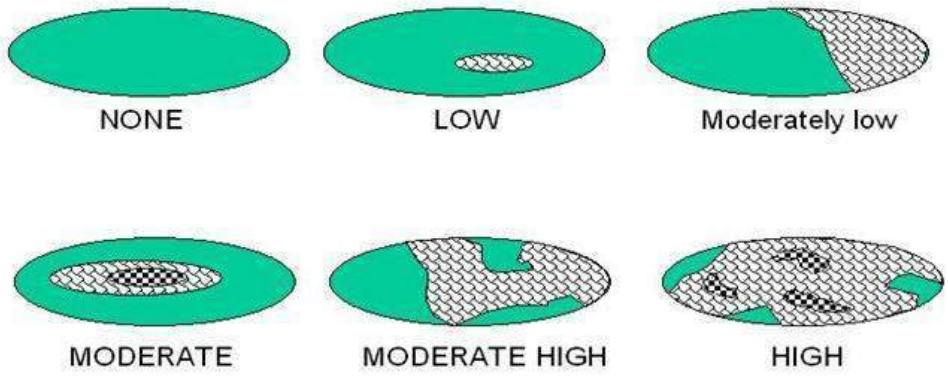

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	18
	Metric 4: Habitat	14
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	44

KIF Retirement

PID

W35

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W36
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	7
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 7.00

KIF Retirement

PID

W36

Metric 2 Total 14.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W36

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W36

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

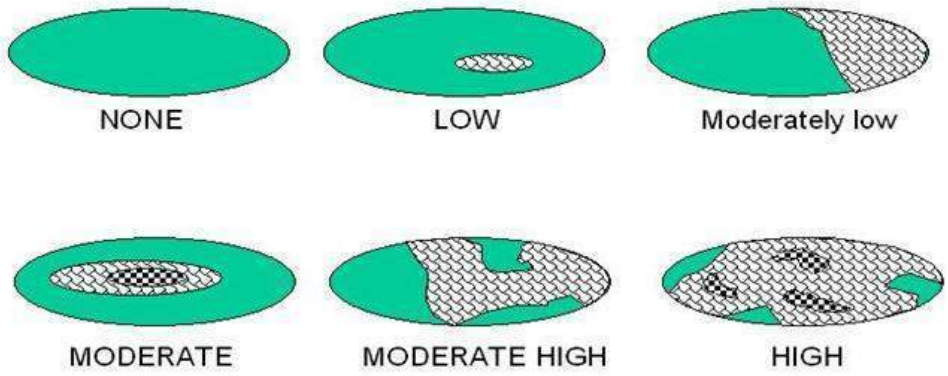

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	14
	Metric 3: Hydrology	19
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	49

KIF Retirement

PID

W36

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W37
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	7
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 7.00

KIF Retirement

PID

W37

Metric 2 Total 14.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W37

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland	X	road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	7.00
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg= 7.00

KIF Retirement

Metric 3 Total 19.00

PID

W37

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W37

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	3.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt LOW Wetland has a low degree of interspersion.	
0pt NONE Wetland has no plan view interspersion	

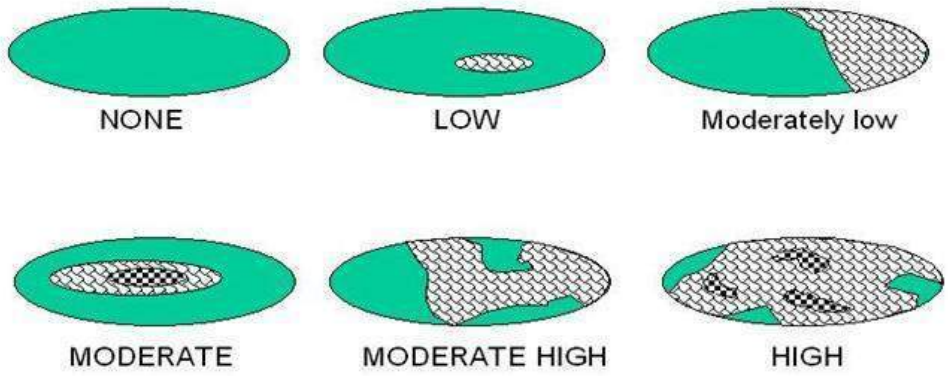

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	14
	Metric 3: Hydrology	19
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	55

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Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W38
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	7
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 7.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	7
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 7.00

KIF Retirement

PID

W38

Metric 2 Total 14.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W38

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

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PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

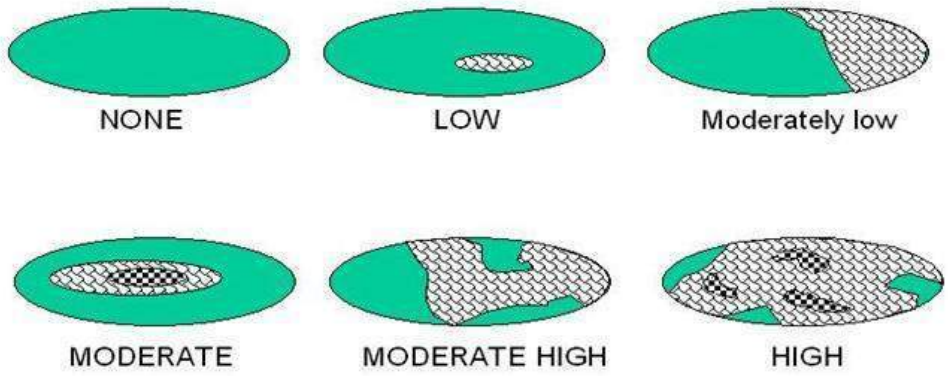

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	14
	Metric 3: Hydrology	19
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	49

KIF Retirement

PID

W38

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W39

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W39

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W39

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 13

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	3.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

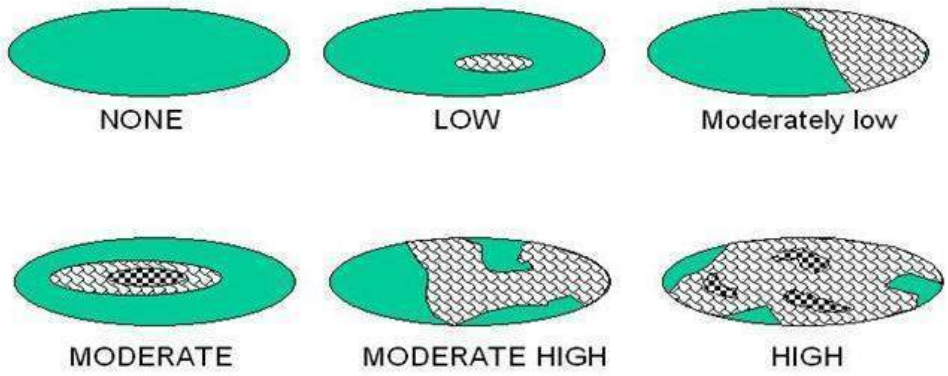

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	19
	Metric 4: Habitat	13
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	44

KIF Retirement

PID

W39

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W40
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W40

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W40

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W40

KIF Retirement

W40

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

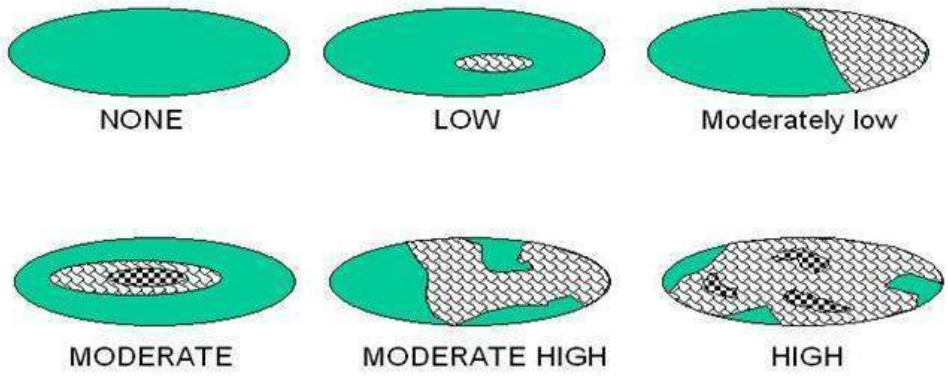

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	19
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	50

KIF Retirement

PID

W40

Rank = Moderate

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W41
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
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0.3	13,067	1,452	114	38	0.12	1,200	35
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Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W41

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W41

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W41

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

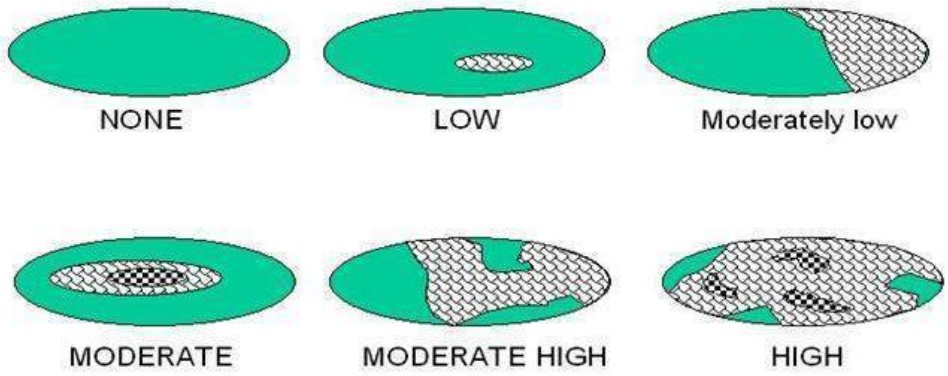

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	7
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	27

KIF Retirement

PID

W41

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

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PID

Quantitative Rating

Tennessee Rapid Assessment Method

W42
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W42

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W42

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W42

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	4.0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

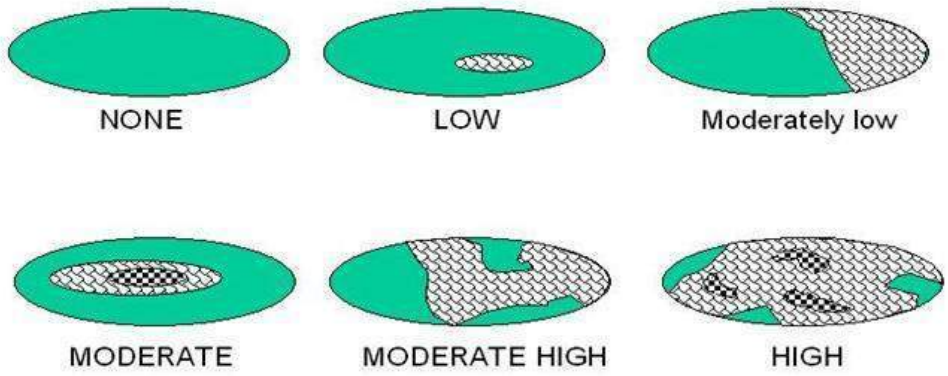

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	14
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	34

KIF Retirement

PID

W42

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W43
6/8/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W43

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	5
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a p other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 3.00

KIF Retirement

PID

W43

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _X_ filling and grading ____plowing ____grazing (hooves) _X_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	3.0
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 3.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W43

KIF Retirement

W43

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	4.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

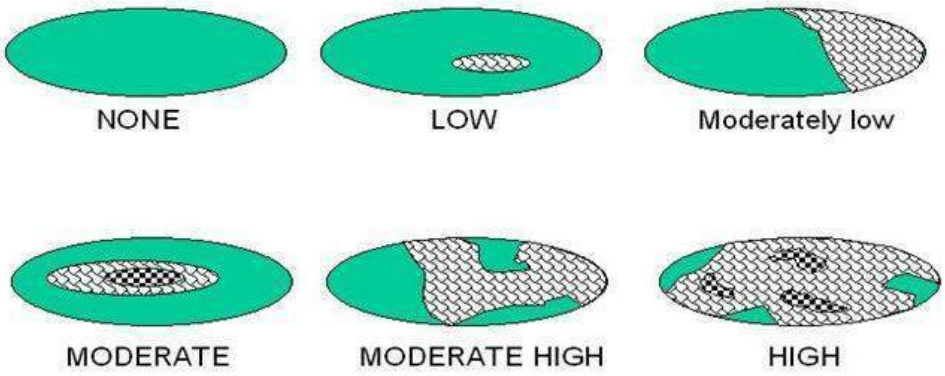

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	18
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	46

KIF Retirement

PID

W43

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W44
6/7/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W44

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W44

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) _x_vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W44

KIF Retirement

W44

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	1.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

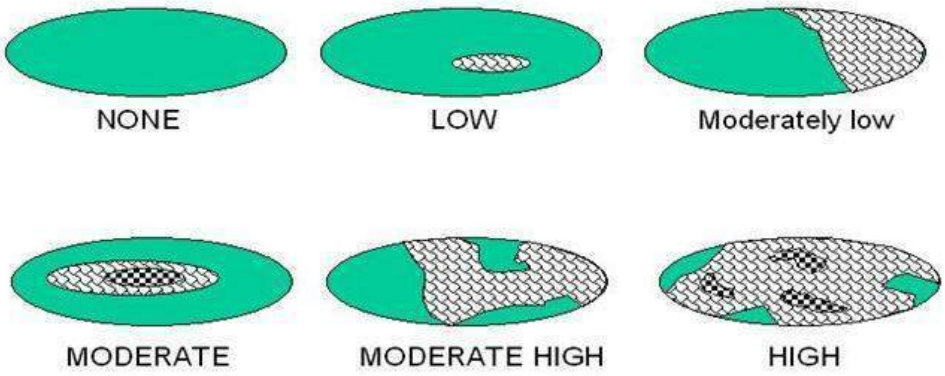

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	7
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	25

KIF Retirement

PID

W44

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

W45
6/7/2022
LRT

Quantitative Rating
Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
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3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W45

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W45

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) _x_vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	3.0
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 3.00

KIF Retirement PID W45

KIF Retirement

W45

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	1.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

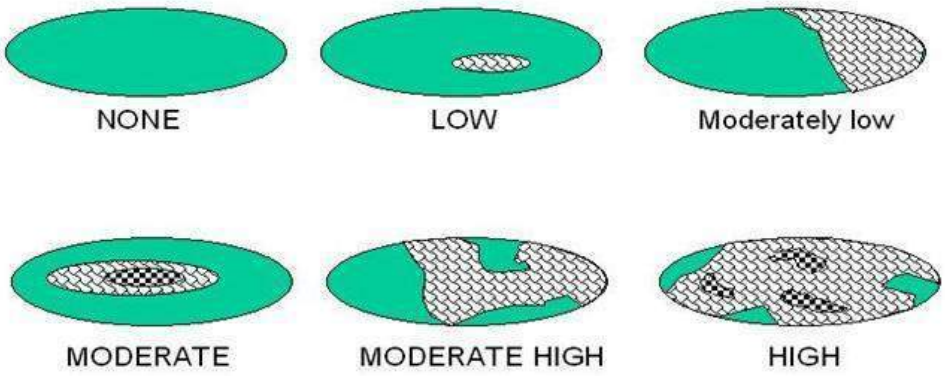

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	7
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	25

KIF Retirement

PID

W45

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W46
6/23/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W46

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W46

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W46

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 12

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	3.0
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

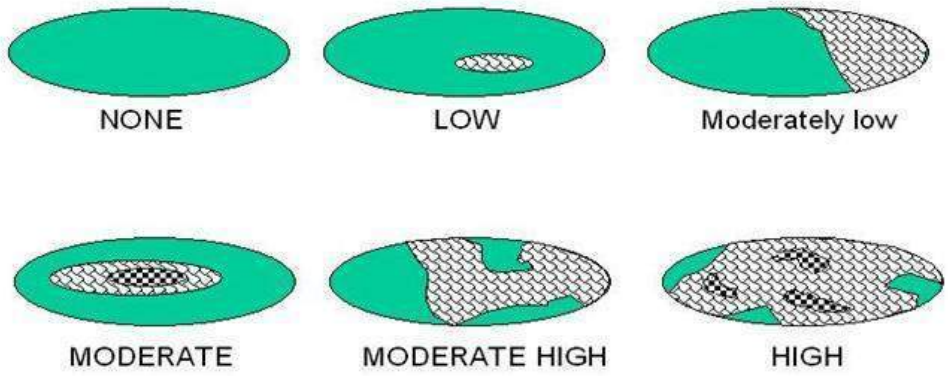

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	12
	Metric 4: Habitat	12
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	28

KIF Retirement

PID

W46

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating

Tennessee Rapid Assessment Method

W47
6/22/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	4
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 4.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W47

Metric 2 Total 9.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W47

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W47

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 11

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	3.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

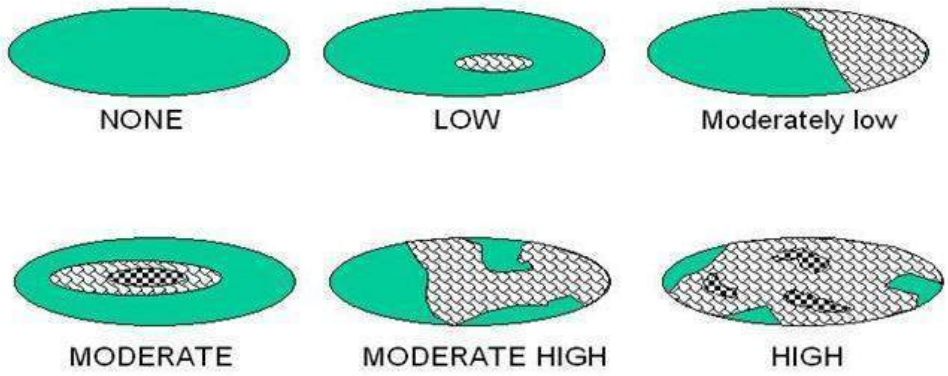

Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	-1
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 1

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	9
	Metric 3: Hydrology	12
	Metric 4: Habitat	11
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	1
	TOTAL SCORE	36

KIF Retirement

PID

W47

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

Quantitative Rating

Tennessee Rapid Assessment Method

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	5
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 5.00

KIF Retirement

PID

W48

Metric 2 Total 6.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3d Avg.= 2.00

KIF Retirement

PID

W48

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) _x_vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2.0
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4a Avg.= 2.00

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2.0
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4b Avg.= 2.00

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KIF Retirement

W48

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	6.0
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 6.00

Metric 4 Total 10

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	2.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt LOW Wetland has a low degree of interspersion.	1.0
0pt NONE Wetland has no plan view interspersion	

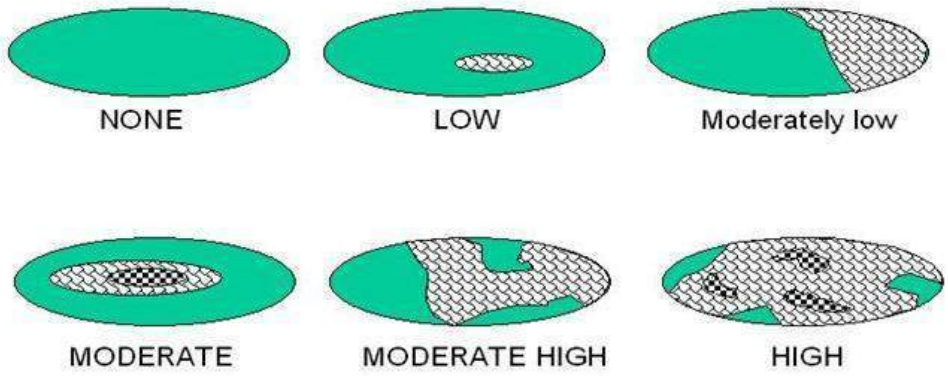


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total _____

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	6
	Metric 3: Hydrology	11
	Metric 4: Habitat	10
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	0
	TOTAL SCORE	28

KIF Retirement

PID

W48

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

KIF Retirement

PID

Quantitative Rating
Tennessee Rapid Assessment Method

W49
6/20/2022
LRT

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.

7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	1
0pts	VERY NARROW. <10m (<32ft) around perimeter.	

2a Avg.= 1.00

2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.

7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	3
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	

2b Avg.= 3.00

KIF Retirement

PID

W49

Metric 2 Total 4.00

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a part of, other nearby wetland or upland habitat areas.	1
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	1

3d Avg.= 1.00

KIF Retirement

PID

W49

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

3e Avg=

Metric 3 Total _____

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): ____filling and grading ____plowing ____grazing (hooves) ____vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 4 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.			
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.		
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.		
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.		
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.		4a Avg.=

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.		
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.		
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.		
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.		
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.		
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.		
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.		4b Avg.=

KIF Retirement

W49

PID

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

X	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
	Clearcutting		Dredging
X	Selective cutting		Row-crop or orchard farming
	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
X	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3.0
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

4c Avg. = 3.00

Metric 4 Total 8

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
	5pts - >10m sq sphagnum or other moss or other vernal pools		5 pts - Superior fish, waterfowl, bat, or amphibian breeding habitat
	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)		5 pts - Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water water quality of 303(d) listed stream and/or to surface or and/or to ground water
	10 pts - Older-aged mature forested wetland avg. DBH >= 30 inches		10 pts - Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points).	Score
6a. Wetland Vegetation Communities Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp*., Spirodela* spp*.)* are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	3.0
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	1.0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2.0
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

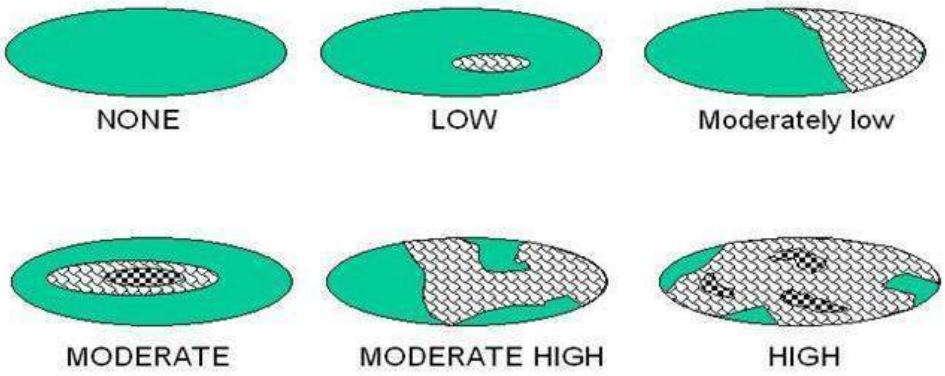


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	0
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	0
Coarse woody debris >15cm (6in) in diameter	0
Standing dead trees >25cm (10in) diameter at breast height	0
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	0

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 2

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	4
	Metric 3: Hydrology	7
	Metric 4: Habitat	8
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	2
	TOTAL SCORE	25

KIF Retirement

PID

W49

Rank = Low

"Wetland Conditions with an overall score of 100-75 are considered Exceptional Tennessee Waters. Wetlands with a score of 74-45 are considered to have moderate resource value, and wetland with a score of 44 and below have a low resource value."
(TRAM 2015, pg 2)

HD Stream Dataforms

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID :
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 8.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 21.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 24) two cricket frogs were spotted jumping into the creek 28) Juncus efficus was observed within the channel bed.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Unnamed perennial stream	Date/Time: 6/14/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 2, blue line stream	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.016242°/ - -85.052529°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable = 27.5

Justification / Notes :

Blue line stream that starts outside of Project study area flows into a pond, then flows under a concrete road/culvert and then down into a forested area.

BW: 3-4 feet

BH: 1-2 feet

Water depth: 6-1 foot

Substrate:sand, cobble, gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 10.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 27.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 14) a pond flows into this stream through a culvert

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Unnamed perennial stream	Date/Time: 6/14/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 3- Perennial stream runs through powerline easement and down into forested area offsite	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.014680°/ - -85.046744°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (

Secondary Indicator Score (if applicable =

Justification / Notes :

Blue lined stream runs from forested area through powerline easement back into wooded area. Bottom of two hillsides

BW: 3-5 feet

BH: 1-2 feet

Water depth: 6-8 inches

Substrate:sand, cobble,

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 6.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 11.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 27.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

25) Midges, scuds,

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to the Obed River	Date/Time: 6/12/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 4- UNT to Obed River is a small spring that flows into the Obed	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.010006°/ - 85.034433°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

UNT to the Obed River, its a small spring that leads into the Obed. It starts outside of the study area

BW: 3-5 feet

BH: 1-2 feet

Water depth: 6-8 inches

Substrate:sand, cobble, blouder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 14)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 29.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

15. Stream was flowing during the time of the survey

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Obed River	Date/Time: 6/12/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 5- Obed River	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.009809°/ - 36.009809°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Obed River, large and deep flowing river

BW: 30-35 feet

BH: 1-3 feet

Water depth: Unknown: too deep to test

Substrate:cobble, boulders and potentially sand

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Rocky Branch Creek	Date/Time: 6/12/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 6- Rocky Branch Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.009146°/ - 85.031181°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Rocky Branch located at the bottom of a steep hillslope within the TVA ROW

BW: 10-15 feet

BH: 1-3 feet

Water depth: 8 inches to 3 feet

Substrate:sand, cobble, blouder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Rocky Branch side channel	Date/Time: 6/12/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 7- Rocky Branch side channel	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.009264 °/ - 85.031174 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 18.5

Justification / Notes :

UNT to Rocky Branch (blue line stream)

BW: 10-15 feet

BH: 3-5 feet

Water depth: 0

Substrate:cobble, boulders

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 11)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 18.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Rocky Branch	Date/Time: 6/12/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 8- Rocky Branch	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.008860°/ - -85.030509°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Rocky Branch, perennial blueline stream

BW: 20-30 feet

BH: 2-4 feet

Water depth: 1-3 feet

Substrate:sand, cobble, boulders

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Rocky Branch	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 9- UNT to Rocky Branch.	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.005364 °/ - 85.014106 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Lily loam, 6 to 12 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 22.5

Justification / Notes :

This stream is a small UNT to Rocky Branch that runs from a PEM outside the project study area and then flows outside of the project study area into Rocky Branch

BW: 1-3 feet

BH: 6 inches to 1 foot

Water depth: 6 inches or less

Substrate:mud and gravel and small cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 7.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Rocky Branch	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 10- UNT to Rocky Branch.	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.999325, -85.006704
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Lily loam, 6 to 12 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 22

Justification / Notes :

This stream is a small UNT to Rocky Branch that runs through a wetland.

BW: 1-2 feet

BH: 6 inches to 1 foot

Water depth: 6 inches or less

Substrate:mud and gravel and small cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 27) there was a ton of iron oxidizing bateria/fungus throughout the entirety of this stream that was within the project study area.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Rocky Branch	Date/Time: 6/14/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 11- UNT to Rocky Branch. Flows through cow pasture	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.999325, -85.006704
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Lily loam, 6 to 12 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 18.5

Justification / Notes :

UNT to Rocky Branch (blue line stream). This stream flows through the TVA powerline easement and an active cow pasture down into a large wetland/stream complex.

BW: 2-3 feet

BH: 1-2 feet

Water depth: 6 inches or less

Substrate:mud and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 18.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 28) Juncus effuscus was within multiple sections of the channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 11 (b)- Intermittent	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: Kingston Western TL/ TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.001122 °/ - 85.011948 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Lily loam, 6 to 12 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable) = 22

Justification / Notes :

This stream is a small UNT to Rocky Branch that runs through a wetland.

BW: 1-2 feet

BH: 6 inches to 1 foot

Water depth: 6 inches or less

Substrate:mud and gravel and small cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 27) there was a ton of iron oxidizing bateria/fungus throughout the entirety of this stream that was within the project study area.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Rocky Branch	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 12- Rocky Branch. Flows at the bottom of hillslope and wetland	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.999158°/ - 85.006913°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Rocky Branch, blue line perennial stream flows as the bottom of two hillslopes and a large PEM wetland

BW: 8-10 feet

BH: 2-4 feet

Water depth: 1-3 feet

Substrate:sand, cobble, boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 13	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 13	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.985406°, -84.331316°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: ROANE
Soil Type(s) / Geology : Fullerton-Pailo complex, 20 to 35 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable = 16.5

Justification / Notes : FLOWS AT BOTTOM OF A HILL, INTERMITTENT, STARTS & ENDS OUTSIDE STUDY AREA, MAPPED ON NWI

BANK WIDTH: 3-4 FT

BANK HEIGHT: 2-4 FT

WATER DEPTH: 0

SUBSTRATE: GRAVEL, SILT, COBBLE

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 14 Clinch River	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 14 Perennial	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.987402, -84.329503
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: ROANE
Soil Type(s) / Geology : Fullerton-Pailo complex, 20 to 35 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable = 15

Justification / Notes : FLOWS AT BOTTOM OF 2 HILLS, PIPELINE RUNS OVER TOP OF IT

BANK WIDTH: 1-3 FT

BANK HEIGHT: 6 IN - 1 FT

WATER DEPTH: 0

SUBSTRATE: GRAVEL, COBBLE

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 15

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 17	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 17	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.969720°,-84.343924°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: ROANE
Soil Type(s) / Geology : Colbert-Lyerly-Rock outcrop complex, 5 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable =

Justification / Notes : LARGE PERENNIAL STREAM

BANK WIDTH: 20-50 FT

BANK HEIGHT: 2-5 FT

WATER DEPTH: UNKNOWN DEPTH, DEEP, MURKY

SUBSTRATE: LOOKS SANDY BUT UNKNOWN

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 18	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 18	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.954902°, -84.361698°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: ROANE
Soil Type(s) / Geology : N/A	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable =

Justification / Notes : LARGE PERENNIAL STREAM

BANK WIDTH: 20-50 FT

BANK HEIGHT: 2-5 FT

WATER DEPTH: UNKNOWN DEPTH, DEEP, MURKY

SUBSTRATE: LOOKS SANDY BUT UNKNOWN

5: CADDISFLYS, MIDGES, 6: WATER PENNY, LEFT HANDED SNAILS, MAYFLY

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 19	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 19	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.955031°, -84.361077°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: ROANE
Soil Type(s) / Geology : N/A	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable =

Justification / Notes : CONNECTS TO S-18 WHICH THEN FLOWS ACROSS THE ROAD, INTERMITTENT

BANK WIDTH: 1-3 FT

BANK HEIGHT: 6 IN - 1 FT

WATER DEPTH: 6 IN

SUBSTRATE: SILT, SAND, GRAVEL

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 20.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Clinch River	Date/Time: 6/20/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 20- Clinch River located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.932442°/ - 35.932442
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Clinch River located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-2 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 24 (perennial)- UNT to Poplar Creek	Date/Time: 6/24/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID :
Site Name/Description: Stream 21 (Perennial)- Poplar Creek	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.927439 °/ -84.401340°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)		**Stream**
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		**Stream**
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Poplar Creek- Perennial

BW: 35-40 feet

BH: 1 to 2 feet

Water depth: unknown- Deep

Substrate: unknow murky water, potentially sand, cobble, blounder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 22, Intermittent Stream	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 22 located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.942476 °/ -84.413553 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable) = 22

Justification / Notes :

Intermittent Stream that runs through a wetland within the TVA ROW

BW: 1-2 feet

BH: 1-2 feet

Water Depth- Sections of the stream contained 6 inches to 10 inches of water. Others were dry

Substrate:sand, cobble, gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 12)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 24) cricket frog was observed near the stream. 26) several rocks within the stream had filimentous algae

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork Poplar Creek	Date/Time: 6/20/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 23- East Fork Poplar Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.943845 °/ - 84.402642 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

East Fork Poplar Creek located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 24 (perennial)- UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID :
Site Name/Description: Stream 24 (Perennial)- UNT to Poplar Creek	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.949303 °/ - 84.388392 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)		**Stream**
7. Presence of naturally occurring ground water table connection		**Stream**
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		**Stream**
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Poplar Creek- Perennial

BW: 35-40 feet

BH: 1 to 2 feet

Water depth: unknown- Deep

Substrate: unknow murky water, potentially sand, cobble, blounder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 24 (Intermittent)- UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: B. Hartshorn and J. Mace	Project ID : Kingston EIS
Site Name/Description: Stream 24 (Intermittent)- Kingston EIS	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.949303 °/ - 84.388392 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes	Source: NRCS
Surrounding Land Use : Industrial and TVA ROW	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable) = 19.75

Justification / Notes :

UNT to Poplar Creek. This intermittent is the start of the a perennial steam.

BW: 2-4 feet

BH: 6 inches to 1 foot

Substrate: Gravel, silt, mud

Water depth- 0 inches at the time to te survey

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.75)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 24 (perennial)- UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID :
Site Name/Description: Stream 25 (Perennial)- Poplar Creek	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.946171°/ - 84.386323 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)		**Stream**
7. Presence of naturally occurring ground water table connection		**Stream**
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		**Stream**
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Poplar Creek- Perennial

BW: 35-40 feet

BH: 1 to 2 feet

Water depth: unknown- Deep

Substrate: unknow murky water, potentially sand, cobble, blounder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to East Fork Poplar Creek	Date/Time: 6/9/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 26- UNT East Fork Poplar Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.945696 °/ - 84.384590 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable) =

Justification / Notes :

UNT to East Fork Poplar Creek.

BW: 2-4 feet

BH: 6 inches to 1 foot

Water Depth- No water was in the channel at the time of the survey

Substrate:sand, silt, gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 13)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : This stream is within the floodplain of East Fork Poplar Creek.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Bear Creek	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 27- Bear Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.949260 °/ - 84.375516 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Bear Creek, blueline stream that crossed the study area four times

BW: 20-25 feet

BH: 2-4 feet

Water depth: very deep, wasnt able to determine depth due to cloudy water

Substrate:potentially sand, cobble, boulders

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: BBear Creek	Date/Time: 6/20/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 28- BBear Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.947714 °/ - 84.368594 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Bear Creek located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: BBear Creekk	Date/Time:
Assessors/Affiliation:	Project ID :
Site Name/Description:Stream 29B- Bear Creek located at the bottom of TVA ROW	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Bear Creek	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 30- Bear Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.948476 °/ - 84.363732 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Bear Creek located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Bear Creek	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 31- Bear Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.948476 °/ - 84.363732 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Bear Creek located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 32, Perennial Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) , B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 32 located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.954115 °/ - 84.359167 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) = 22

Justification / Notes :

Perennial Stream located within the TVA ROW

BW: 4-5 feet

BH: 6 inches to 1 foot

Water Depth- Sections of the stream contained 6 inches to 10 inches of water. Others were dry

Substrate:muck, gravel, and sand

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =12.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 28

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 24) cricket frog was observed near the stream. 26) several rocks within the stream had filimentous algae 25) water striders and water beetles

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 33, Perennial Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) , B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 33 located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.954929 °/ - 84.361512°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) = 30.5

Justification / Notes :

Perennial Stream located within the TVA ROW

BW: 6-8 feet

BH: 6 inches to 1 foot

Water Depth- Sections of the stream contained 6 inches to 10 inches of water. Others were dry

Substrate:muck, gravel, and sand , cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =13.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 30.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 25) 3 caddisflys, water beetle, water striders, and 5 scuds

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 34, Perennial Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) , B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 34 located at the bottom of TVA ROW , connects to stream 33	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.955049 °/ - 84.361059 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) = 30.5

Justification / Notes :

Perennial Stream located within the TVA ROW. Connects to Stream 33

BW: 3-4feet

BH: 6 inches

Water Depth- 6 inches to 1 foot

Substrate:muck, gravel, and sand , cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =13.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 30.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 25) 3 caddisflys, water beetle, water striders, and 5 scuds

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to East Fork Poplar Creek	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 35- UNT to East Fork Poplar Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.960713 °/ - 84.353002 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 19.5

Justification / Notes :

UNT to East Fork Poplar Creek, blueline stream that flows across powerline easement and then into a forested area outside of the project study area.

BW: 3-5 feet

BH: 1 to 2 feet

Water depth: 2 inches in the channel at the time of the survey

Substrate: gravel, cobble, silt

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =11.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain NA	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Heavy rain occured the day before so this category could not be scored

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to East Fork Poplar Creek	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 36- UNT to East Fork Poplar Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.963970°/ - 84.349514°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable = 27.5

Justification / Notes :

UNT to East Fork Poplar Creek, blueline stream that flows across powerline easement and then into a forested area outside of the project study area.

BW: 4 to 6 feet

BH: 6 inches to 1 foot

Water depth: 6 inches to 1 foot in the channel at the time of the survey

Substrate: gravel, cobble, silt, and sand

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =13.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain NA	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 27.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Heavy rain occured the day before so this category could not be scored

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork Poplar Creek	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 37- East Fork Poplar Creek located at the bottom of TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.969803, -84.344168
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

East Fork Poplar Creek located at the bottom of a steep hillslope within the TVA ROW

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 38- Intermittent Stream	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 38- located at the bottom of two hills within the TVA ROW and forested area	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.987402 °/ - 84.329503 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 19

Justification / Notes :

Intermitent Stream located at the bottom of two hillslopes with in the TVA ROW

BW: 2-3 feet

BH: 6 inches to 1 foot

Water Depth- no water was in the stream at the time of the survey

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =9.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 40- Intermittent Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 40- located at the bottom of two hills within the TVA ROW and forested area	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.989711°/ - 84.327414 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 20.5

Justification / Notes :

Intermittent Stream located at the bottom of two hillslopes within the TVA ROW

BW: 3 to 5 feet

BH: 6 inches to 1 foot

Water Depth- 0 to 1 foot

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =11.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 20.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 41- Intermittent Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 41- located at the bottom of two hills within the TVA ROW and forested area	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.993755 °/ - 84.323067 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 21.5

Justification / Notes :

Intermittent Stream located at the bottom of two hillslopes within the TVA ROW

BW: 5 to 6 feet

BH: 1 to 2 feet

Water Depth- 0 inches at the time of the survey

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 13)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 21.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 42- Intermittent Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 42- located at the bottom of two hills within the TVA ROW and forested area	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.999347 °/ - 84.318661 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 20.5

Justification / Notes :

Intermittent Stream located at the bottom of two hillslopes within the TVA ROW

BW: 2 to 3 feet

BH:6 to 10 inches

Water Depth- 0 inches at the time of the survey

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 20.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 43- Intermittent Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 43- located at the bottom of two hills within the TVA ROW and forested area	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.000043 °/ - 84.317372 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 25.5

Justification / Notes :

Intermittent Stream located at the bottom of two hillslopes within the TVA ROW

BW: 4 to 6 feet

BH: 1 to 2 feet

Water Depth- 0 to 6 inches

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 13)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 25.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : caddiesflys (3) found under rocks within the stream

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Brushy Fork Creek	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 44- Brushy Fork Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.023687 °/ - 84.294953°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Brushy Fork Creek located within TVA ROW near a agricultural field

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Brushy Fork Creek	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 45- Brushy Fork Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.024538 °/ - 84.292644 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Brushy Fork Creek located within TVA ROW near a agricultural field

BW: 20-30 feet

BH: 1-6 feet

Water Depth- Too deep to observe the bottom during the time of the survey

Substrate:sand, cobble, potenitally boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 46- Perennial Stream	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR), B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Stream 46- located downhill of Old Blakley Road. Filled with Kudzu	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.022079 °/ - 84.287760 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermitent)

Secondary Indicator Score (if applicable) = 32.5

Justification / Notes :

Perennial Stream located at the bottom of two hillslopes within the TVA ROW. Kudzu infestation surrounds the stream

a small waterfall is near the start of the stream

BW: 4 to 6 feet

BH: 1 to 2 feet

Water Depth- 0 to 6 inches

Substrate:sand, cobble, and gravel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 18)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 32.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : caddiesflys (6) found under rocks within the stream , one mayflie, and a couple midges

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork Poplar Creek	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 47- East Fork Poplar Creek located near Oak Ridge Tpke	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.009421°/ - 84.269742 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

East Fork Poplar Creek. Several fish observed swimming in the stream along with a soft shell turtle.

BW: 20-30 feet

BH: 1-6 feet

Water Depth- 2-3 feet

Substrate:sand, cobble, small boulder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork Poplar Creek	Date/Time: 6/7/2022
Assessors/Affiliation: L.Thiem (HDR) and G. Reinsfelder (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 48- East Fork Poplar Creek located at the bottom of two slopes and near a wetland	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.002783 °/ - 84.263655 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate **Slight** Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable) =

Justification / Notes :

East Fork Poplar Creek. Several fish observed swimming in the stream along with caddisflys and scuds

BW: 6-8 feet

BH: 3- 6 feet

Water Depth- 2-3 feet

Substrate:sand, cobble,

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 49- UNT to East Fork Poplar	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID : Kingston EIS
Site Name/Description: Kingston TL/ TVA ROW	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	36.002928 °/ - 84.263495 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		**Stream**
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable) =

Justification / Notes :

UNT to East Fork Poplar Creek- Intermittent

BW: 2-4 feet

BH: 1 to 2 feet

Water depth: 6 inches to 1 foot

Substrate:sand, cobble, blounder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to White Oak Creek	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR) and L. Hue (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 50- UNT to White Oak Creek	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	35.923100 °/ - 84.336069 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 19

Justification / Notes :

Rocky Branch, blue line perennial stream flows as the bottom of two hillslopes and a large PEM wetland

BW: 2-4 feet

BH: 1-2 feet

Water depth: 6 inches

Substrate:sand, gravel, small cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 50a- Intermittent	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR) and L. Hue (HDR)	Project ID : Kingston EIS
Site Name/Description: Stream 50a- Kingston EIS near Old Knoxville Highway	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.018996°/-84.299587°
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : NOTCOM	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 19

Justification / Notes :

Intermittent stream flows as the bottom of two hillslopes and near Old Knoxville HWY

BW: 2-4 feet

BH: 1-2 feet

Water depth: 6 inches

Substrate:sand, gravel, small cobble

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to White Oak Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID : Kingston EIS
Site Name/Description: Stream 51 (Intermittent)- UNT to White Oak Creek	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.930342 °/ - 84.326228 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Intermittent)

Secondary Indicator Score (if applicable = 16.5

Justification / Notes :

UNT to White Oak Creek- Follows topo lines of hillslope

BW: 2-4 feet

BH: 6 inches - 1 foot

Water depth: dry at the time of the survey

Substrate: gravel, small cobble, and sand

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Stream 24 (perennial)- UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L.Hue	Project ID : Kingston EIS
Site Name/Description: Stream 52 (Perennial)- Poplar Creek	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102080408	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.933391 °/ - 84.317469 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 57.6 acres	County: Roane
Soil Type(s) / Geology : MoE - Montevallo channery silt loam, 20 to 35 percent slopes Source: NRCS	
Surrounding Land Use : Right-of-way, forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	x	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)		**Stream**
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		**Stream**
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (Perennial)

Secondary Indicator Score (if applicable =

Justification / Notes :

Poplar Creek- Perennial

BW: 35-40 feet

BH: 1 to 2 feet

Water depth: unknown- Deep

Substrate: unknow murky water, potentially sand, cobble, blounder

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:Kingston TL/ Eastern section of TVA ROW	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC1/ Ephemeral 1	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC1/Ephemeral 1/ flows at the bottom of two hillslopes	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.002224 °/ - 85.014106 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 10.5

Justification / Notes :

This feature flows at the bottom of two hillslopes

BW: 1-2 feet

BH: 1 foot

Water depth: 0 inches no water in channel

Substrate: mud

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =6)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC2/ Ephemeral 2	Date/Time: 6/15/2022
Assessors/Affiliation: L.Thiem (HDR), J. Mace (HDR), and J. Kay (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC2/Ephemeral 2/ Small roadway drainage feature	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 2.5 inches	36.001665 °/ - 85.012190 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 9

Justification / Notes :

This feature flows into a PEM wetland

BW: 1 foot

BH: 6 inches to 1 foot

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC3/ Ephemeral 3	Date/Time: 6/15/2022
Assessors/Affiliation: L. Thiem, J. Mace, and J. Kay/ HDR	Project ID : Kingston EIS
Site Name/Description: WWC3/ Ephemeral 3	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.992002 °/ -84.990570 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 9.5

Justification / Notes :

Jurisdictional WWC that flows across a roadway down into a wetland

BW: 1-2 feet

BH: 0 to 6 inches

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC4/ Ephemeral 4	Date/Time: 6/15/2022
Assessors/Affiliation: L. Thiem, J. Mace, and J. Kay/ HDR	Project ID : Kingston EIS
Site Name/Description: WWC4/ Ephemeral 4. Flows into wetland	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.992002 °/ -84.990570 °
Precipitation this Season vs. Normal : abnormally wet **elevated** average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 9.5

Justification / Notes :

Jurisdictional WWC that flows across a roadway down into a wetland

BW: 1-2 feet

BH: 0 to 6 inches

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Wet Weather Conveyance 5	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : No hydric soils (7.5YR 4/4), No biology (frogs, macrobenthos etc.). Area historically altered from corn field adjacent to reach.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Ephemeral 6	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	[2]	3
2. Sinuous channel	0	[1]	2	3
3. In-channel structure: riffle-pool sequences	0	[1]	2	3
4. Sorting of soil textures or other substrate	0	[1]	2	3
5. Active/relic floodplain	[0]	0.5	1	1.5
6. Depositional bars or benches	[0]	1	2	3
7. Braided channel	[0]	1	2	3
8. Recent alluvial deposits	[0]	0.5	1	1.5
9. Natural levees	[0]	1	2	3
10. Headcuts	0	[1]	2	3
11. Grade controls	[0]	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	[1.5]
13. At least second order channel on existing USGS or NRCS map	No = [0]		Yes = 3	

B. Hydrology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	[0]	1	2	3
15. Water in channel and >48 hours since sig. rain	[0]	1	2	3
16. Leaf litter in channel (January – September)	1.5	[1]	0.5	0
17. Sediment on plants or on debris	0	0.5	[1]	1.5
18. Organic debris lines or piles (wrack lines)	0	[0.5]	1	1.5
19. Hydric soils in channel bed or sides of channel	No = [0]		Yes = 1.5	

C. Biology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	[2]	1	0
21. Rooted plants in the thalweg [1]	3 [ ]	2	1	0
22. Crayfish in stream (exclude in floodplain)	[0]	1	2	3
23. Bivalves/mussels	[0]	1	2	3
24. Amphibians	[0]	0.5	1	1.5
25. Macrobenthos (record type & abundance)	[0]	1	2	3
26. Filamentous algae; periphyton	[0]	1	2	3
27. Iron oxidizing bacteria/fungus	[0]	0.5	1	1.5
28.Wetland plants in channel bed [2]	[0]	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 14.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Decent bed and bank. no water in reach. Overgrown on bank with rubus argutus. Drains into wetland. No hydric soils. One small head cut leading to wetland. Bank Width:1-2' Bank Height: 1-3'

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : No hydric soils. One headcut near end of reach with water pooled at bottom. Area has been trenched Drains into wetland that has been historically disturbed. Not a natural conveyance. Golden rod in bed of reach.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC 8	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC-8	
Site Location: Kingston, TN	
HUC (12 digit): East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	36.025970°, -84.294511°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 30 sq miles	County: Anderson County
Soil Type(s) / Geology : Armuchee silt loam, 12 to 20 percent slopes AND Swafford loam, 2 to 5 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable =

Justification / Notes : WEAK, NON-JURISDICTIONAL WWC WITH A CULVERT

SUBSTRATE - GRASS, SILT

BW: 1-2 FT

BH: 0-6 IN

WD: 0

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC 9	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC-9	
Site Location: Kingston, TN	
HUC (12 digit): Lower Poplar Creek HUC ID: 060102070303 AND East Fork Poplar Creek HUC ID: 060102070302	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	36.018669°, -84.299764°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : Lower Poplar Creek- 50 sq miles, East Fork Poplar Creek - 30 sq miles	County: Anderson County
Soil Type(s) / Geology : Fullerton-Pailo complex, 12 to 20 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable =

Justification / Notes : CONCRETE DRAINAGE DITCH ON THE ROADSIDE

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC16/ Ephemeral 10	Date/Time: 6/6/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC16, small WWC that flows into a wetland	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.923750°/ -84.345038 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable =

Justification / Notes :

This feature is a WWC off the side of a gravel access road/biking trail

BW: 1-2 feet

BH: 6 inches to 1 foot

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC22/ Ephemeral 11	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 22/ Ephemeral 11- flows down a hillslope into an intermittent stream	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.989260 °/ -84.327599 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 11

Justification / Notes :

Drainage feature that flows into an intermittent stream. Flows down a hillslope

BW: 2 to 3 feet

BH: 6 inches to 1 foot

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC24/ Ephemeral 12	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 24/ Ephemeral 12- flows at the bottom of two hillsopes within the TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.996467 °/ -84.320449 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 11

Justification / Notes :

Follows topo within TVA ROW and then into the offsite forested area.

BW: 3 to 6 feet

BH: 6 inches to 2 foot

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Losese bed and bank within the TVA ROW

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC25/ Ephemeral 13	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 25/ Ephemeral 13- flows at the bottom of two hillsopes within the TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	36.001820 °/ -84.316064°
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 12

Justification / Notes :

Follows topo within TVA ROW and then into the offsite forested area.

BW: 3 to 5 feet

BH: 4 to 5 feet

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC30/ Ephemeral 14	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 30/ Ephemeral 14- flows at the bottom of two hillsopes within the TVA ROW	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	36.018182 °/ -84.279217 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 13

Justification / Notes :

Follows topo within TVA ROW. Kudzu infestation surrounds the WWC

BW: 1 to 3 feet

BH: 1 to 2 feet

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC33/ Ephemeral 15	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 33/Ephemeral 15- flows from culvert down through wetland	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	36.004762°/ -84.265852 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 12

Justification / Notes :

Flows from culvert down through wetland and across maintained grass.

BW: 1 to 2 feet

BH: 6 inches

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC36/ Ephemeral 16	Date/Time: 6/8/2022
Assessors/Affiliation: L.Thiem (HDR), J. Calderon-Brandt (HDR), B. Eden (HDR)	Project ID : Kingston EIS
Site Name/Description: WWC 36 /Ephemeral 16- flows from hillsope	
Site Location: Kingston, TN	
HUC (12 digit): Emory River 06010208	Lat/Long:
Previous Rainfall (7-days) : In the past 7 days it rained 0.50 inches	35.923750°/ -84.345038 °
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 872 sq miles	County: Roane County
Soil Type(s) / Geology : Hamblem silt loam, 0-2 percent slopes	Source: USDA: Web Soil Survey
Surrounding Land Use : Utility line ROW, forested area, and residential neighborhoods	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions NA	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable = 12

Justification / Notes :

Follows topo within TVA ROW.

BW: 1 to 2 feet

BH: 6 inches

Water depth: 0 inches no water in channel

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to White Oak Creek	Date/Time: 6/22/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC39/ Ephemeral 17	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.933744 °/ -84.317490°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable = 5

Justification / Notes :

This feature was the top of a mapped blue line stream. The bottom turns into a perennial. The WWC portion has vegetation (upland) throughout the entire stream. It flows across an access road and acts as a drainage feature for the paved roadway.

BW: 0-2 feet

BH: 0- 6 inches

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to White Oak Creek	Date/Time: 6/22/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID :
Site Name/Description: WWC40/ Ephemeral 18	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.933275 °/ -84.317558°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 ñYesò, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable =

Justification / Notes :

This is a ripraped channel that flows alongside the roadway and into a perennial stream that eventually crosses the roadway through a culvert

BW: none

BH: none

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HD Drainage Feature Dataforms

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description: WWC 8/	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description: WWC 9/	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC11/ Drainage Feature 4	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.939214°/ -84.410925°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 11

Justification / Notes :

Concreted mapped blue line stream. Water was not flowing in the channel. Riprap halts the flow of the water to follow topo.

BW: Concreted potenitially 3-4 feet

BH: Concreted at a slope so was undetermined

Substrate: concrete

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	[2]	3
2. Sinuous channel	0 [1]	1	2	3
3. In-channel structure: riffle-pool sequences	[0]	1	2	3
4. Sorting of soil textures or other substrate	[0]	1	2	3
5. Active/relic floodplain	[0]	0.5	1	1.5
6. Depositional bars or benches	[0]	1	2	3
7. Braided channel	[0]	1	2	3
8. Recent alluvial deposits	[0]	0.5	1	1.5
9. Natural levees	[0]	1	2	3
10. Headcuts	[0]	1	2	3
11. Grade controls	0	0.5	[1]	1.5
12. Natural valley or drainageway	0	[0.5]	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = [0]		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	[0]	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	[2]	3
16. Leaf litter in channel (January – September)	[1.5]	1	0.5	0
17. Sediment on plants or on debris	[0]	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	[0]	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1] NA- Concrete channel	3	2	1	0
21. Rooted plants in the thalweg [1] NA- Concrete Channel	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	[0]	1	2	3
23. Bivalves/mussels	[0]	1	2	3
24. Amphibians	[0]	0.5	1	1.5
25. Macrobenthos (record type & abundance)	[0]	1	2	3
26. Filamentous algae; periphyton	0	1	2	[3]
27. Iron oxidizing bacteria/fungus	[0]	0.5	1	1.5
28.Wetland plants in channel bed [2] Juncus effusus	0	[0.5]	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC12/ Drainage Feature 5	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.940649°/ -84.413421°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 7

Justification / Notes :

This was a previously mapped blueline stream however do to riprap and blockage further up in the stream no water currently flows within it. The feature now follows along the roadway then to a culvert and out to a sharp drop

BW: 1 to 5 feet

BH: 6 inches to 2 feet

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UNT to Poplar Creek	Date/Time: 6/23/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC13/ Drainage Feature 6	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.941584°/ -84.409905°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		[WWC]
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		[WWC]
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

Roadside drainage ditch that flows at the bottom of two slopes. The channel is filled with upland vegetation

BW: 2-3 feet

BH: 6 inches

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC17/ Upland Drainage Feature 7	Date/Time: 6/21/2022
Assessors/Affiliation: L. Thiem, L. Hue, and B. Hartshorn	Project ID : Kingston EIS
Site Name/Description: WWC17/ Upland Drainage Feature 7	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.951341°/ -84.360019°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes : Area has been historically disturbed to create access roads. Culvert has been installed within the reach. Bed and bank absent with upland plants throughout. Located near an access road within a forested area.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC17a/ Upland Drainage Feature 8	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC18/ Upland Drainage Feature 9	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC19/ Upland Drainage Feature 10	Date/Time: 6/8/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC19/ Upland Drainage Feature 10	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.972666°/ -84.341094°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

Roadside ditch located located along Oak Ridge Tpke. Upland vegetation growing throughout the entire WWC

No bed and bank present throughout. Water flows through one culvert across a roadway.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description: WWC21/ Upland Drainage Feature 11	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC23/ Upland Drainage Feature 12	Date/Time: 6/8/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC23/ Upland Drainage Feature 12	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.992170°/ -84.324660°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Upland grasses growing within the channel.

This WWC flows at the bottome of two smaller hills near a residential house.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC26/ Upland Drainage Feature 14	Date/Time: 6/7/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC26/ Upland Drainage Feature 14	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	36.006217°/ -84.312111°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Substrate consisted of rocks and gravel

This WWC flows within a forested area and across the TVA ROW.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC27/ Upland Drainage Feature 15	Date/Time: 6/7/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC27/ Upland Drainage Feature 15	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	36.007512°/ -84.310343°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Upland vegetation growing throughout the entire chann

This WWC flows across the TVA ROW. The substrate is the same as the surrounding area.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC28/ Upland Drainage Feature 16	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC29/ Upland Drainage Feature 17	Date/Time: 6/6/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC29/ Upland Drainage Feature 17	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	36.025986°/ -84.294582°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Upland vegetation growing within the channel

The channel flows through a culvert down into maintained lawn.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC31/ Upland Drainage Feature 18	Date/Time: 6/6/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC31/ Upland Drainage Feature 18	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	36.015559°/ -84.275742°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. The channel is concreted throughout the channel

The channel flows within maintained lawn

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC32/ Upland Drainage Feature 19	Date/Time:
Assessors/Affiliation:	Project ID : Kingston EIS
Site Name/Description:	
Site Location:	
HUC (12 digit):	Lat/Long:
Previous Rainfall (7-days) :	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size :	County:
Soil Type(s) / Geology :	Source:
Surrounding Land Use :	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge		WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC34/ Upland Drainage Feature 20	Date/Time: 6/6/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC34/ Upland Drainage Feature 20	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 2.25 inches	36.001073°/ -84.261043
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Flows along a roadway and through a culvert

Upland vegetation present throughout most (80%) of the channel.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC35/ Upland Drainage Feature 21	Date/Time: 6/6/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: WWC35/ Upland Drainage Feature 21	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 2.25 inches	35.999292°/ -84.257671
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel. Flows at the edge of the proposed TL area

Upland vegetation present throughout most (80%) of the channel.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC37	Date/Time: 6/22/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC37/ Drainage Feature 22	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.923554°/ -84.335052°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		**[WWC]**
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

This feature follows the topo of hillsides. The channel is filled with vegetation.

BW: none

BH: none

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC38	Date/Time: 6/22/2022
Assessors/Affiliation: L. Thiem and L. Hue	Project ID : Kingston EIS
Site Name/Description: WWC38/ Drainage Feature 23	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 0.1 inches	35.926594°/ -84.330692°
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : NOTCOM	Source: NRCS
Surrounding Land Use : Transmission access roads, Oak Ridge Laboratory	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		**[WWC]**
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

This feature follows the topo of hillsides. The channel is filled with vegetation.

BW: none

BH: none

Substrate: same as surrouding soils

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Upland Drainage Feature 24/ WWC 20	Date/Time: 6/8/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Upland Drainage Feature 24/ WWC 20	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 2.25 inches	35.979274 °/ - 84.317523 °
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel.

Upland vegetation present throughout most (80%) of the channel. Leaves covering the entire channel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Upland Drainage Feature 25/ WWC 16	Date/Time: 6/8/2022
Assessors/Affiliation: L. Thiem, B. Eden, and J. Calderon-Brandt	Project ID : Kingston EIS
Site Name/Description: Upland Drainage Feature 25/ WWC 16	
Site Location: Oak Ridge, TN	
HUC (12 digit): 060102070405	Lat/Long:
Previous Rainfall (7-days) : 2.25 inches	35.932734 °/ -84.336385 °
Precipitation this Season vs. Normal : abnormally wet elevated **[average]** low abnormally dry unknown Source of recent & seasonal precip data : NOAA Station Oak Ridge 3.1 NNW	
Watershed Size : 25 acres	County: Roane
Soil Type(s) / Geology : Unknown	Source: NRCS
Surrounding Land Use : Transmission access roads	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	x	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**[WWC]**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except *Gambusia*)	x	Stream
7. Presence of naturally occurring ground water table connection	x	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	x	Stream
9. Evidence watercourse has been used as a supply of drinking water	x	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

No bed and bank present throughout the entire length of the channel.

Upland vegetation present throughout most (80%) of the channel. Leaves covering the entire channel

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Appendix C

Normal Weather Conditions

June 2022 M o at n A	A	A	
Cr ter a- va ues are n nches A	1st M onth Pr r A May-22	2n M onth pr r A pril-22	3r M onth Pr r March-22
Standard Dev at n	1.97	1.84	2.18
	1 83	9	2.61
N rma Prec p tat n	3.80	7	4.79
P us 1 Std. Dev at n A	5.77	5.59	6.97
Actua Est mated Ra nfa	5.0	5.0	4.0
C nd t n (e evated, w, average) A	verage	verage A	verage
C nd na Sc reA A	2		2
We ght	3	2	1
Pr duct A	6	4	2
		Sum=	12
Overa Wetness* A			Average A

A

Appendix D

Photolog

Latitude	36.015845º
Longitude	-85.050127º
Photo Direction	NE
Date Stamp	6/16/2022

1. Wetland 1(PEM, DP1-W1)

Latitude	36.014901 º
Longitude	-85.046211 º
Photo Direction	NE
Date Stamp	6/16/2022

2. Wetland 2 (PEM, DP3-W2)

Latitude	36.013965º
Longitude	-85.044934 º
Photo Direction	S
Date Stamp	6/13/2022

3. Wetland 3 (PEM, DP6-W6)

Latitude	36.012835º
Longitude	-85.041765º
Photo Direction	NW
Date Stamp	6/6/2022

4. Wetland 4 (PEM, DP8-W4)

Latitude	36.008885º
Longitude	-85.031464º
Photo Direction	E
Date Stamp	6/13/2022

5. Wetland 5 (PFO, DP11-W5)

Latitude	36.005536º
Longitude	-85.022705º
Photo Direction	NW
Date Stamp	6/16/2022

6. Wetland 6 (PEM, DP13-W6)

Latitude	36.005558º
Longitude	-85.021606º
Photo Direction	SW
Date Stamp	6/16/2022

7. Wetland 7 (PFO, DP15-W7)

Latitude	36.003887º
Longitude	-85.017372º
Photo Direction	E
Date Stamp	6/16/2022

8. Wetland 8 (PEM, DP16-W8)

Latitude	36.001451º
Longitude	-85.011965º
Photo Direction	E
Date Stamp	6/16/2022

9. Wetland 9 (PEM, DP18-W9)

Latitude	36.000731º
Longitude	-85.010591º
Photo Direction	NE
Date Stamp	6/16/2022

10. Wetland 10 (PEM, DP20-W10)

Latitude	35.998941º
Longitude	-85.006072º
Photo Direction	W
Date Stamp	6/16/2022

11. Wetland 11 (PEM, DP22-W11)

Latitude	35.996617º
Longitude	-85.002772º
Photo Direction	NW
Date Stamp	6/16/2022

12. Wetland 12 (PEM, DP26-W12)

Latitude	35.994324º
Longitude	-84.995521º
Photo Direction	N
Date Stamp	6/16/2022

13. Wetland 13 (PEM, DP28-W13)

Latitude	35.993234º
Longitude	-84.992439º
Photo Direction	N
Date Stamp	6/16/2022

14. Wetland 14 (PEM, DP30-W14)

Latitude	35.993021º
Longitude	-84.992031º
Photo Direction	SE
Date Stamp	6/16/2022

15. Wetland 15 (PEM, DP33-W15)

Latitude	35.989622º
Longitude	-84.98442º
Photo Direction	NW
Date Stamp	6/16/2022

16. Wetland 16 (PEM, DP34-W16)

Latitude	35.914149º
Longitude	-84.478822º
Photo Direction	NE
Date Stamp	6/20/2022

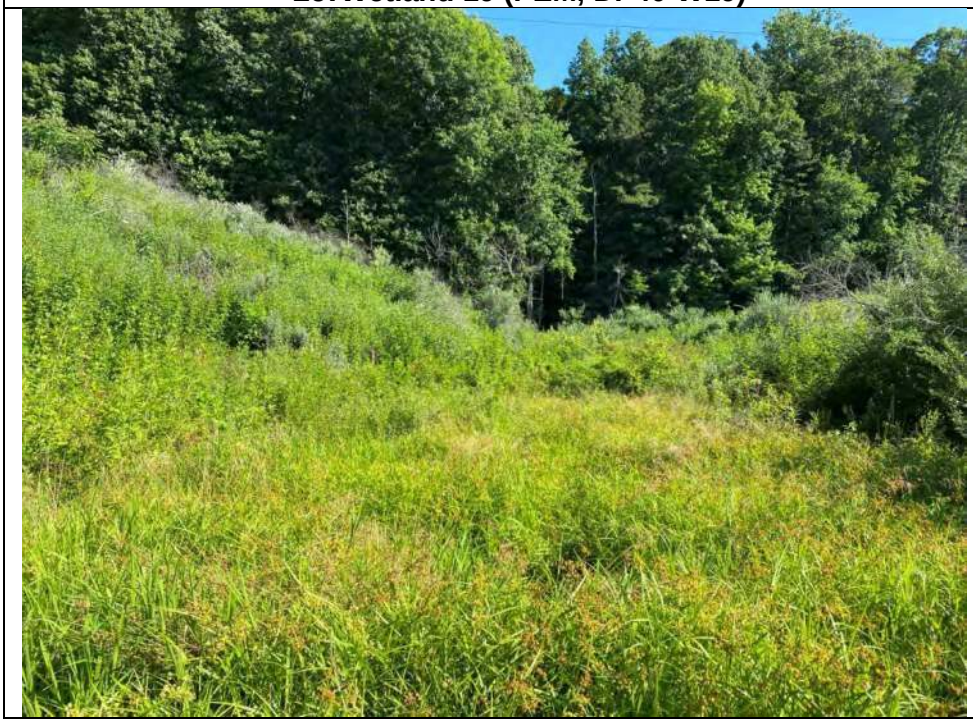
17. Wetland 17 (PEM, DP36-W17)

Latitude	35.915674º
Longitude	-84.47362º
Photo Direction	SE
Date Stamp	6/20/2022

18. Wetland 18 (PFO, DP38-W18)

Latitude	35.916667º
Longitude	-84.471224º
Photo Direction	N
Date Stamp	6/20/2022

19. Wetland 19 (PEM, DP40-W19)



Latitude	35.917268º
Longitude	-84.468740º
Photo Direction	N
Date Stamp	6/21/2022

20. Wetland 20 (PEM, DP42-W20)

Latitude	35.917747º
Longitude	-84.467428º
Photo Direction	E
Date Stamp	6/21/2022

21. Wetland 21 (PEM, DP44-W21)

Latitude	35.919204º
Longitude	-84.464462º
Photo Direction	NW
Date Stamp	6/21/2022

22. Wetland 22 (PEM, DP46-W22)

Latitude	35.919253º
Longitude	-84.462020º
Photo Direction	NW
Date Stamp	6/21/2022

23. Wetland 23 (PEM, DP48-W23)

Latitude	35.919806º
Longitude	-84.460770º
Photo Direction	W
Date Stamp	6/21/2022

24. Wetland 24 (PEM, DP50-W24)

Latitude	35.920480º
Longitude	-84.457555º
Photo Direction	N
Date Stamp	6/21/2022

25. Wetland 25 (PEM, DP52-W25)

Latitude	35.926067º
Longitude	-84.438342º
Photo Direction	N
Date Stamp	6/23/2022

26. Wetland 26 (PSS/PFO, DP54-W26)

Latitudes	[illegible]
Longitudes	[illegible]
Photo Directions	Se
Date Stamps	[illegible]

27. Wetland 27 (PEM/PSS, [illegible])

Latitudes	[illegible]
Longitudes	[illegible]
Photo Directions	SEe
Date Stamps	[illegible]

28. Wetland 28 (PEM/PSS, [illegible])

Page Break

Latitude	35.927300º
Longitude	-84.402255º
Photo Direction	NE
Date Stamp	6/22/2022

29. Wetland 29 (PEM, DP61-W29)

Latitude	35.927923º
Longitude	-84.403228º
Photo Direction	SW
Date Stamp	6/22/2022

30. Wetland 30 (PEM, DP63-W30)

Latitude	35.942531º
Longitude	-84.413743º
Photo Direction	N
Date Stamp	6/22/2022

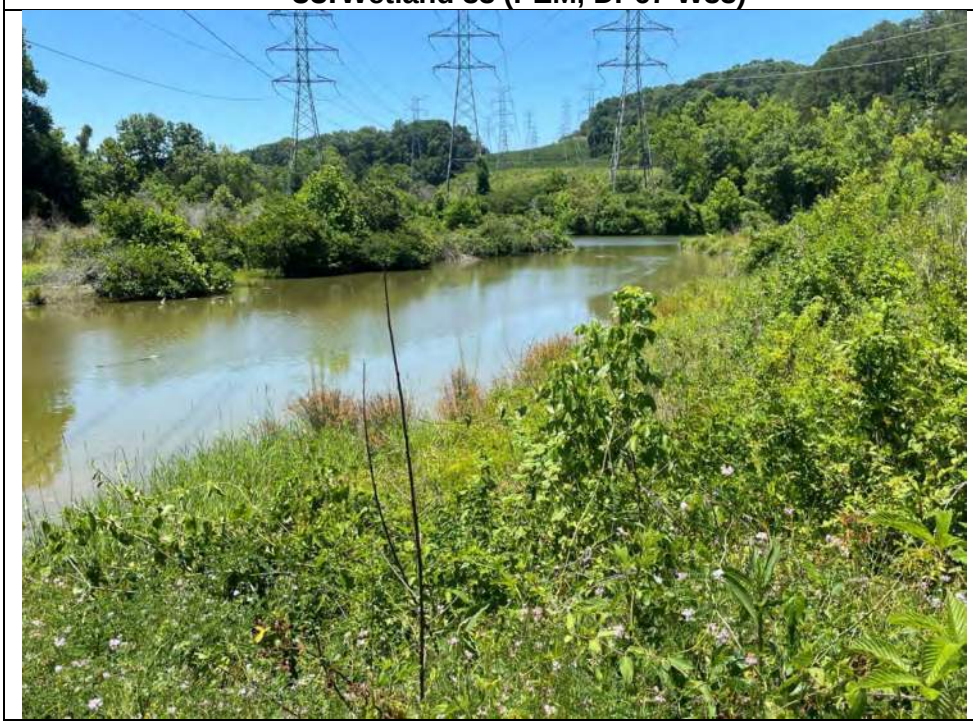
31. Wetland 31 (PEM, DP64-W31)

Latitude	35.944227º
Longitude	-84.397141º
Photo Direction	W
Date Stamp	6/22/2022

32. Wetland 32 (PEM/PFO, DP67-W32)

Latitude	35.944649º
Longitude	-84.396618º
Photo Direction	NW
Date Stamp	6/23/2022

33. Wetland 33 (PEM, DP67-W33)



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Longitude	-84.387772º
Photo Direction	S
Date Stamp	6/20/2022

34. Wetland 34 (PEM, DP68-W34)

Latitude	35.945894º
Longitude	-84.385764º
Photo Direction	SE
Date Stamp	6/22/2022

35. Wetland 35 (PEM, DP70-W35)

Latitude	35.947537º
Longitude	-84.367221º
Photo Direction	SE
Date Stamp	6/10/2022

36. Wetland 36 (PFO, DP72-W36)

Latitude	35.947482º
Longitude	-84.366640º
Photo Direction	SW
Date Stamp	6/10/2022

37. Wetland 37 (PEM/PFO, DP73-W37)

Latitude	35.947204º
Longitude	-84.367025º
Photo Direction	N
Date Stamp	6/10/2022

38. Wetland 38 (PFO, DP74-W38)

Latitude	35.947908º
Longitude	-84.364273º
Photo Direction	S
Date Stamp	6/9/2022

39. Wetland 39 (PEM/PFO, DP76-W39)

Latitude	35.960537º
Longitude	-84.352802º
Photo Direction	W
Date Stamp	6/9/2022

40. Wetland 40 (PEM, DP78-W40)

Latitude	35.966534º
Longitude	-84.347361º
Photo Direction	NE
Date Stamp	6/9/2022

41. Wetland 41 (PFO, DP82-W41)

Latitude	35.969650º
Longitude	-84.344710º
Photo Direction	SW
Date Stamp	6/8/2022

42. Wetland 42 (PFO, DP84-W42)

Latitude	36.023624º
Longitude	-84.295223º
Photo Direction	W
Date Stamp	6/7/2022

43. Wetland 43 (PEM, DP86-W43)

Latitude	36.004817º
Longitude	-84.265689º
Photo Direction	N
Date Stamp	6/6/2022

44. Wetland 44 (PEM/PSS, DP89-W44)

Latitude	36.002553º
Longitude	-84.263139º
Photo Direction	S
Date Stamp	6/6/2022

45. Wetland 45 (PEM, DP91-W45)

Latitude	35.923792º
Longitude	-84.345068º
Photo Direction	NE
Date Stamp	6/21/2022

46. Wetland 46 (PEM, DP94-W46)

Latitude	35.922853º
Longitude	-84.335932º
Photo Direction	NW
Date Stamp	6/20/2022

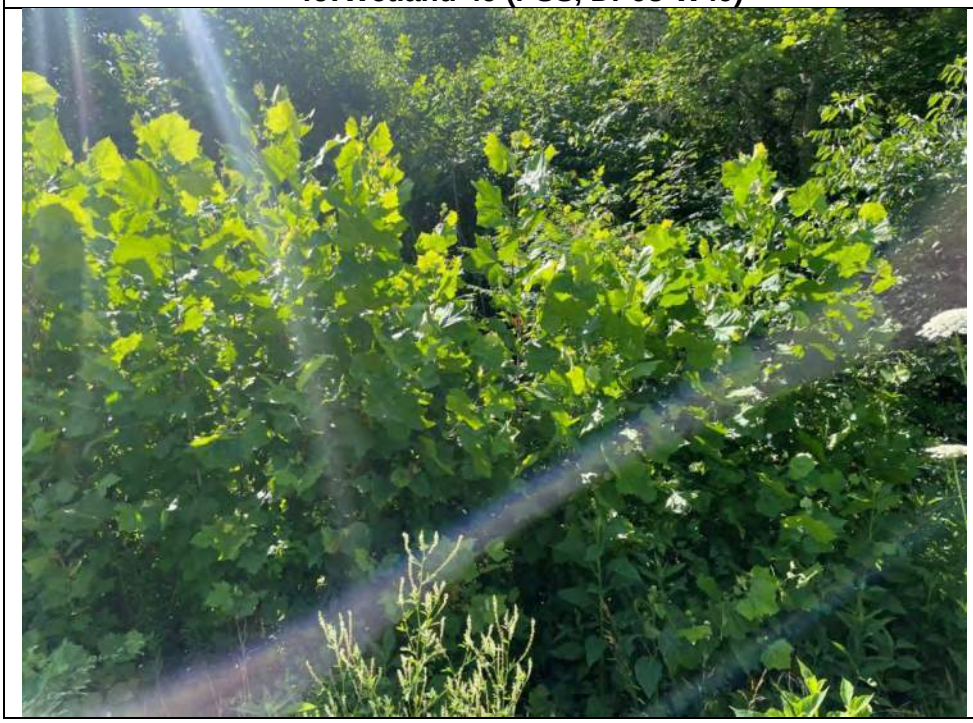
47. Wetland 47 (PSS, DP96-W47)

Latitude	35.934151º
Longitude	-84.317672º
Photo Direction	NW
Date Stamp	6/21/2022

48. Wetland 48 (PSS, DP98-W48)

Latitude	35.934044º
Longitude	-84.317455º
Photo Direction	E
Date Stamp	6/21/2022

49. Wetland 49 (PSS, DP98-W49)



Latitude	36.016587º
Longitude	-85.052343º
Photo Direction	SW
Date Stamp	6/16/2022

50. Open Water 1

Latitude	36.010617º
Longitude	-85.035754º
Photo Direction	NW
Date Stamp	6/13/022

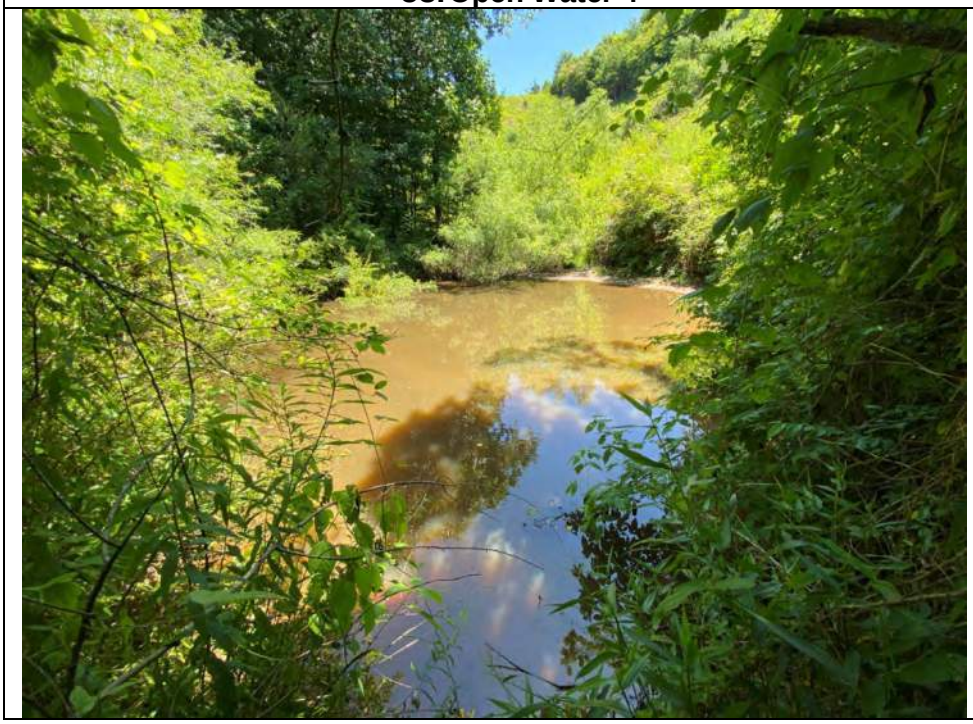
51. Open Water 2

Latitude	35.997317º
Longitude	-85.003067º
Photo Direction	E
Date Stamp	6/17/2022

52. Open Water 3

Latitude	35.914236º
Longitude	-84.479094º
Photo Direction	E
Date Stamp	6/20/2022

53. Open Water 4



Latitude	35.918438º
Longitude	-84.466508º
Photo Direction	SW
Date Stamp	6/21/2022

54. Open Water 5

Latitude	35.918714º
Longitude	-84.464903º
Photo Direction	S
Date Stamp	6/21/2022

55. Open Water 6

Latitude	35.920114º
Longitude	-84.460673º
Photo Direction	NE
Date Stamp	6/21/2022

56. Open Water 7

Latitude	35.934412º
Longitude	-84.411171º
Photo Direction	E
Date Stamp	6/22/2022

57. Open Water 8

Latitude	36.016987º
Longitude	-85.052902º
Photo Direction	NW
Date Stamp	6/15/2022

58 Stream 1 (Intermittent), facing upstream and northwest.

Latitude	36.017242º
Longitude	-85.053088º
Photo Direction	SW
Date Stamp	6/15/2022

59. Stream 1 (Intermittent), facing downstream and southeast

Latitude	36.016242º
Longitude	-85.052529º
Photo Direction	SW
Date Stamp	6/15/2022

60. Stream 2 (Perennial), facing downstream and southwest

Latitude	36.016894º
Longitude	-85.052201º
Photo Direction	N
Date Stamp	6/15/2022

61. Stream 2 (Perennial), facing upstream and north

Latitude	36.010006º
Longitude	-85.034433º
Photo Direction	NE
Date Stamp	6/15/2022

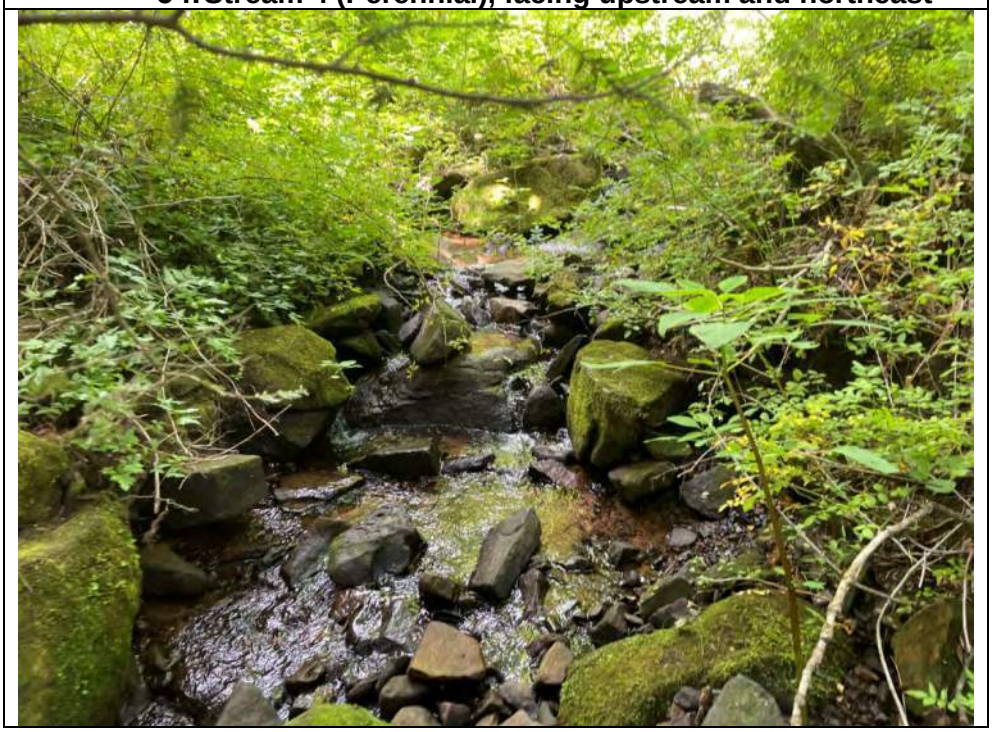
62.Stream 3 (Perennial), facing upstream and northeast

Latitude	36.014680º
Longitude	-85.046744º
Photo Direction	S
Date Stamp	6/15/2022

63. Stream 3 (Perennial), facing downstream and south

Latitude	36.010043º
Longitude	-85.034617º
Photo Direction	NE
Date Stamp	6/16/2022

64. Stream 4 (Perennial), facing upstream and northeast



Latitude	36.010098º
Longitude	-85.034124º
Photo Direction	NE
Date Stamp	6/16/2022

65. Stream 4 (Perennial), facing upstream and northeast

Latitude	36.009634º
Longitude	-85.033713º
Photo Direction	N
Date Stamp	6/14/2022

66. Stream 5 (Obed River, Perennial), facing upstream and north

Latitude	36.009846º
Longitude	-85.033946º
Photo Direction	S
Date Stamp	6/14/2022

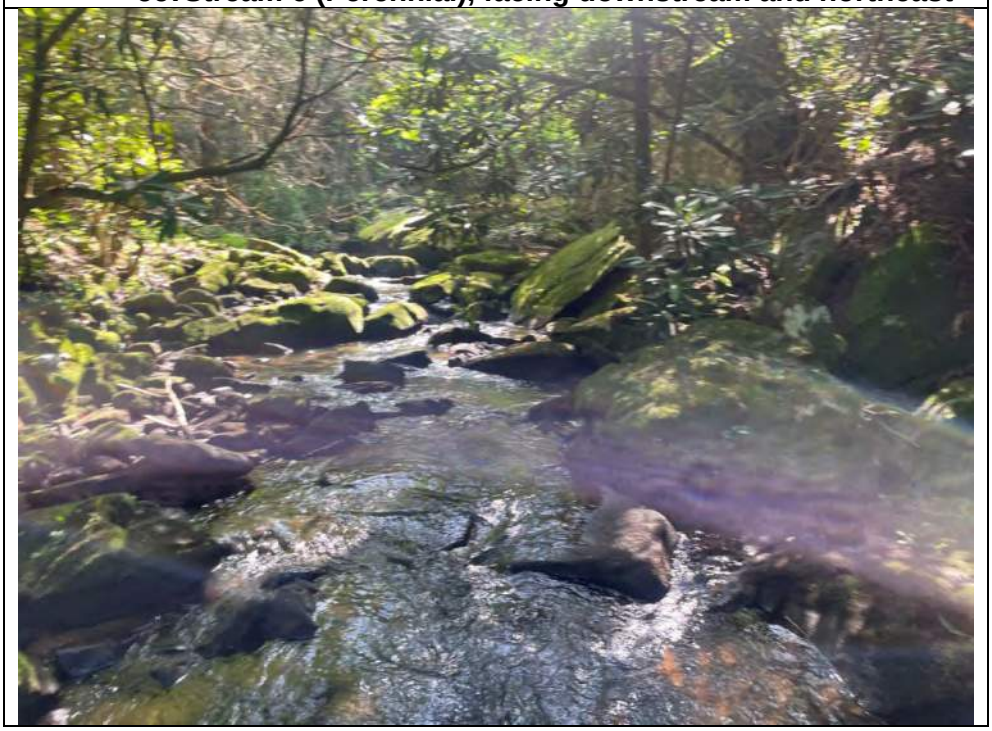
67. Stream 5 (Obed River, Perennial), facing downstream and south

Latitude	36.008851º
Longitude	-85.031672º
Photo Direction	SW
Date Stamp	6/14/2022

68. Stream 6 (Perennial), facing downstream and southwest

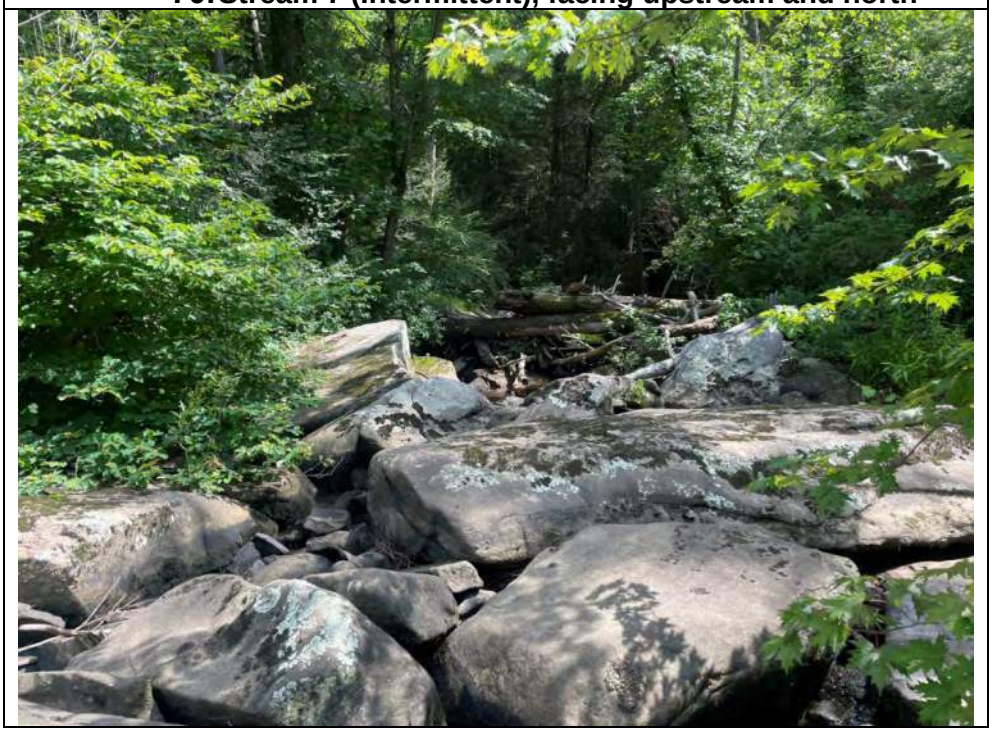
Latitude	36.009218º
Longitude	-85.031050º
Photo Direction	NE
Date Stamp	6/14/2022

69. Stream 6 (Perennial), facing downstream and northeast



Latitude	36.009227º
Longitude	-85.031219º
Photo Direction	N
Date Stamp	6/14/2022

70. Stream 7 (Intermittent), facing upstream and north

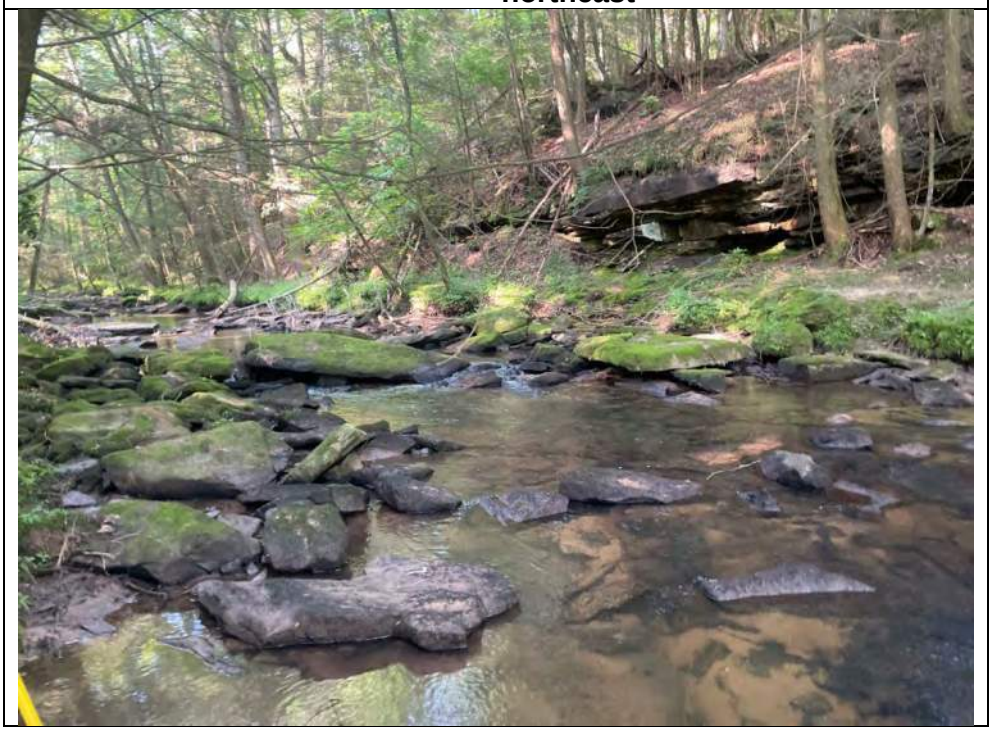


Latitude	36.008600º
Longitude	-85.030048º
Photo Direction	SE
Date Stamp	6/14/2022

71. Stream 8 (Rocky Branch, Perennial), facing downstream and southeast

Latitude	36.007599º
Longitude	-84.473859º
Photo Direction	N
Date Stamp	6/14/2022

72. Stream 8 (Rocky Branch, Perennial), facing upstream and northeast



Latitude	36.005565º
Longitude	-85.021801º
Photo Direction	S
Date Stamp	6/17/2022

73. Stream 9 (Intermittent), facing downstream and south

Latitude	36.005382º
Longitude	-85.021926 º
Photo Direction	N
Date Stamp	6/17/2022

74. Stream 9 (Intermittent), facing upstream and north

Latitude	36.003617º
Longitude	-85.017327º
Photo Direction	S
Date Stamp	6/17/2022

75. Stream 10 (Intermittent), facing downstream and south

Latitude	36.001255º
Longitude	-85.011934º
Photo Direction	N
Date Stamp	6/17/2022

76. Stream 11b (Intermittent), facing upstream and north

Latitude	36.001194º
Longitude	-85.011963º
Photo Direction	S
Date Stamp	6/17/2022

77. Stream 11b (Intermittent), facing downstream and south

Latitude	35.999117º
Longitude	-85.007279°
Photo Direction	NE
Date Stamp	6/18/2022

78. Stream 12 (Rocky Branch, Perennial), facing upstream and northeast

Latitude	35.999488º
Longitude	-85.006714º
Photo Direction	S
Date Stamp	6/18/2022

79. Stream 12 (Rocky Branch, Perennial), facing downstream and south

Latitude	35.999312 º
Longitude	-85.006735º
Photo Direction	E
Date Stamp	6/18/2022

80. Stream 13 (Intermittent), facing upstream and east

Latitude	35.998063º
Longitude	-85.003936º
Photo Direction	W
Date Stamp	6/18/2022

81. Stream 13 (Intermittent), facing downstream and west

Latitude	35.901878º
Longitude	-84.497927º
Photo Direction	NE
Date Stamp	6/23/2022

82. Stream 14 (Clinch River, Perennial), facing northeast

Latitude	35.906534º
Longitude	-84.492733
Photo Direction	SW
Date Stamp	6/23/2022

83. Stream 14 (Clinch River, Perennial), facing southwest

Latitude	35.916005º
Longitude	-84.474219º
Photo Direction	N
Date Stamp	6/23/2022

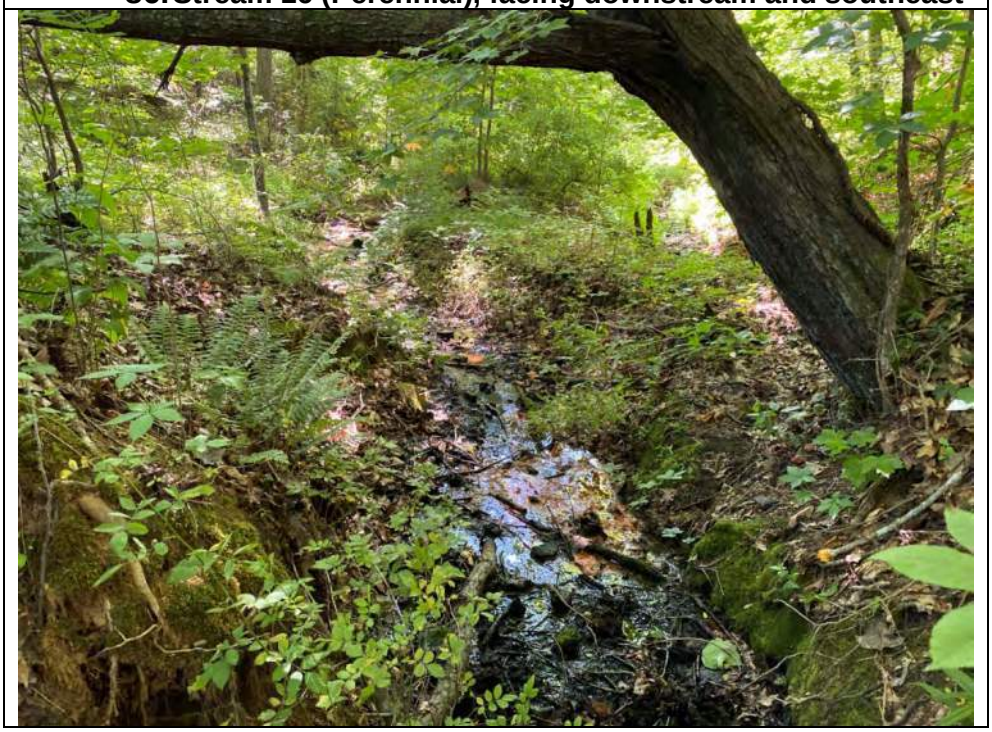
84. Stream 15 (Perennial), facing upstream and north

Latitude	35.915753º
Longitude	-84.473716º
Photo Direction	NE
Date Stamp	6/23/2022

85. Stream 15 (Perennial), facing upstream and northeast

Latitude	35.915732º
Longitude	-84.473722º
Photo Direction	SE
Date Stamp	6/23/2022

86. Stream 16 (Perennial), facing downstream and southeast



Latitude	35.915642º
Longitude	-84.473581º
Photo Direction	NW
Date Stamp	6/19/2022

87. Stream 16 (Perennial), facing upstream and northwest

Latitude	35.916161º
Longitude	-84.465167º
Photo Direction	NE
Date Stamp	6/19/2022

88. Stream 17 (Intermittent), facing upstream and northeast

Latitude	35.925540º
Longitude	-84.438584º
Photo Direction	N
Date Stamp	6/20/2022

89. Stream 18 (Perennial), facing upstream and north

Latitude	35.926028º
Longitude	-84.4387191º
Photo Direction	S
Date Stamp	6/20/2022

90. Stream 18 (Perennial), facing downstream and south

Latitude	35.933002º
Longitude	-84.421572º
Photo Direction	SE
Date Stamp	6/20/2022

91. Stream 19 (Perennial), facing downstream and southeast

Latitude	35.932650 º
Longitude	-84.421126º
Photo Direction	N
Date Stamp	6/20/2022

92. Stream 19 (Perennial), facing upstream and north

Latitude	35.932600º
Longitude	-84.421157º
Photo Direction	SE
Date Stamp	6/20/2022

93. Stream 20 (Clinch River, Perennial), facing downstream and southeast

Latitude	35.926058º
Longitude	-84.400241º
Photo Direction	NE
Date Stamp	6/21/2022

94. Stream 21 (Poplar Creek, Perennial), facing upstream and northeast

Latitude	35.942529º
Longitude	-84.413655º
Photo Direction	SE
Date Stamp	6/21/2022

95. Stream 22 (Intermittent), facing downstream and southeast

Latitude	35.942280º
Longitude	-84.413179 º
Photo Direction	NW
Date Stamp	6/21/2022

96. Stream 22 (Intermittent), facing upstream and northwest

Latitude	35.943675º
Longitude	-84.402671º
Photo Direction	S
Date Stamp	6/21/2022

97. Stream 23 (Poplar Creek, Perennial), facing downstream and south

Latitude	35.949392º
Longitude	-84.388285°
Photo Direction	E
Date Stamp	6/21/2022

98. Stream 24 (Perennial), facing downstream and east

Latitude	35.949244 º
Longitude	-84.388697°
Photo Direction	W
Date Stamp	6/21/2022

99. Stream 24 (Intermittent), facing upstream and west

Latitude	35.946252º
Longitude	-84.386773°
Photo Direction	SE
Date Stamp	6/19/2022

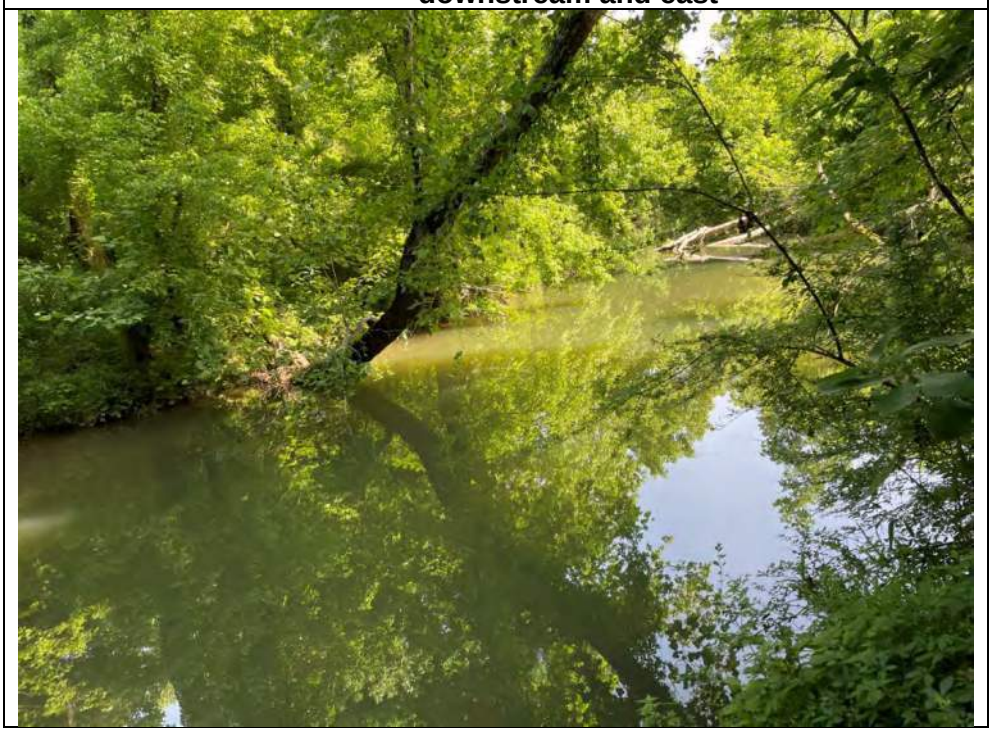
100. Stream 25 (East Fork Poplar Creek, Perennial), facing downstream and southeast

Latitude	35.945353º
Longitude	-84.385215°
Photo Direction	NE
Date Stamp	6/10/2022

101. Stream 26 (Intermittent), facing upstream and northeast

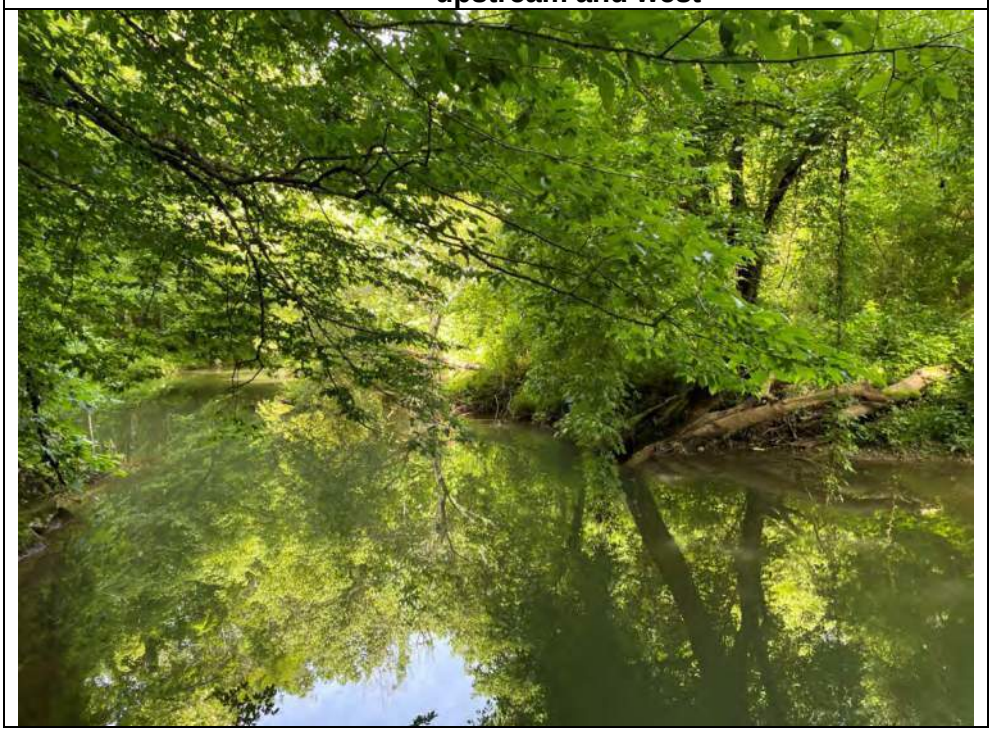
Latitude	35.948884º
Longitude	-84.373873
Photo Direction	E
Date Stamp	6/10/2022

102. Stream 27 (East Fork Poplar Creek, Perennial), facing downstream and east



Latitude	35.949174º
Longitude	-84.375342°
Photo Direction	W
Date Stamp	6/10/2022

103. Stream 27 (East Fork Poplar Creek, Perennial), facing upstream and west



Latitude	35.947679º
Longitude	-84.368716°
Photo Direction	N
Date Stamp	6/9/2022

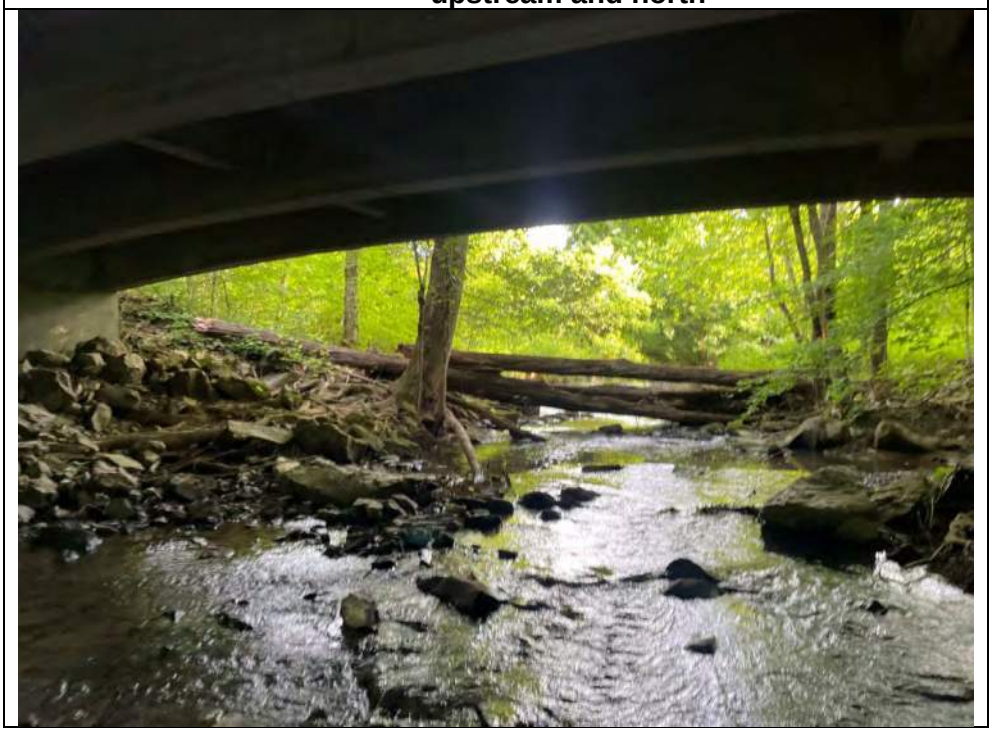
104. Stream 28 (Bear Creek, Perennial), facing upstream and north

Latitude	35.947986º
Longitude	-84.368467°
Photo Direction	NW
Date Stamp	6/9/2022

105. Stream 28 (Bear Creek, Perennial), facing upstream and northwest

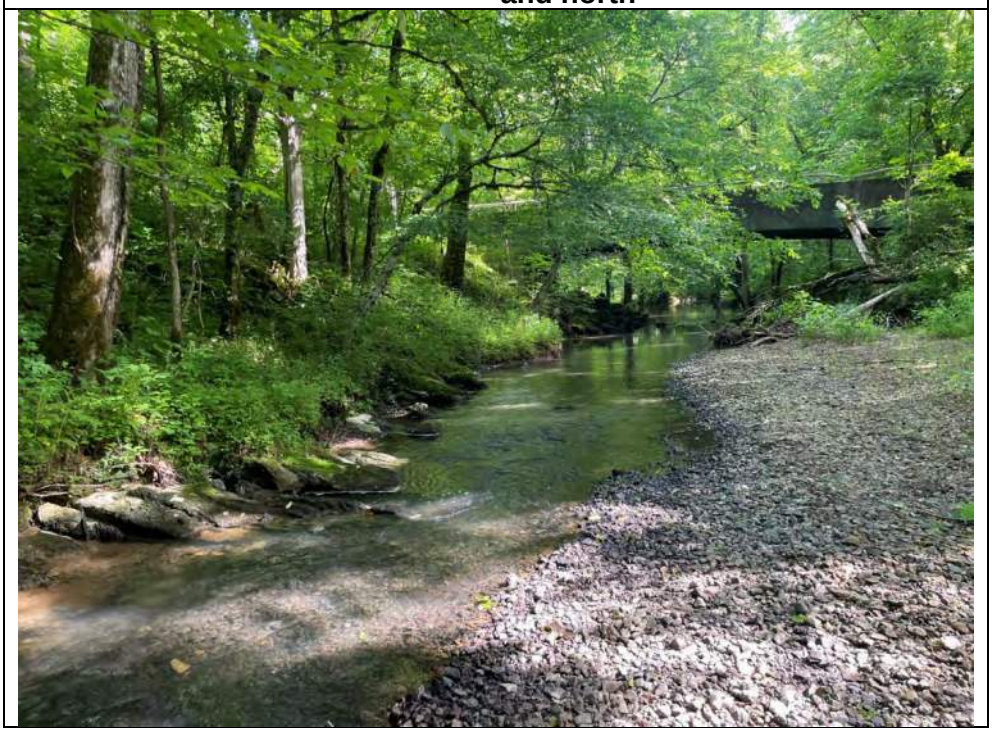
Latitude	35.947231º
Longitude	-84.366837°
Photo Direction	N
Date Stamp	6/9/2022

106. Stream 29 (East Fork Poplar Creek, Perennial), facing upstream and north



Latitude	35.947383º
Longitude	-84.368652°
Photo Direction	N
Date Stamp	6/9/2022

107. Stream 30 (Bear Creek, Perennial), facing upstream and north



Latitude	35.946789º
Longitude	-84.363279°
Photo Direction	N
Date Stamp	6/9/2022

108. Stream 31 (Bear Creek, Perennial), facing upstream and north

Latitude	35.954155º
Longitude	-84.359213°
Photo Direction	NW
Date Stamp	6/9/2022

109. Stream 32 (Perennial), facing upstream and northwest

Latitude	35.953796º
Longitude	-84.358701°
Photo Direction	SE
Date Stamp	6/9/2022

110. Stream 32 (Intermittent), facing downstream and southeast

Latitude	35.954933º
Longitude	-84.361535°
Photo Direction	E
Date Stamp	6/8/2022

111. Stream 33 (Perennial), facing downstream and east

Latitude	35.954958º
Longitude	-84.361309°
Photo Direction	E
Date Stamp	6/8/2022

112. Stream 33 (Perennial), facing downstream and east

Latitude	35.954950º
Longitude	-84.361307°
Photo Direction	NE
Date Stamp	6/8/2022

113. Stream 34 (Intermittent), facing upstream and northeast

Latitude	35.955093º
Longitude	-84.360926°
Photo Direction	SW
Date Stamp	6/8/2022

114. Stream 34 (Intermittent), facing downstream and southwest

Latitude	35.960636º
Longitude	-84.352962°
Photo Direction	NW
Date Stamp	6/7/2022

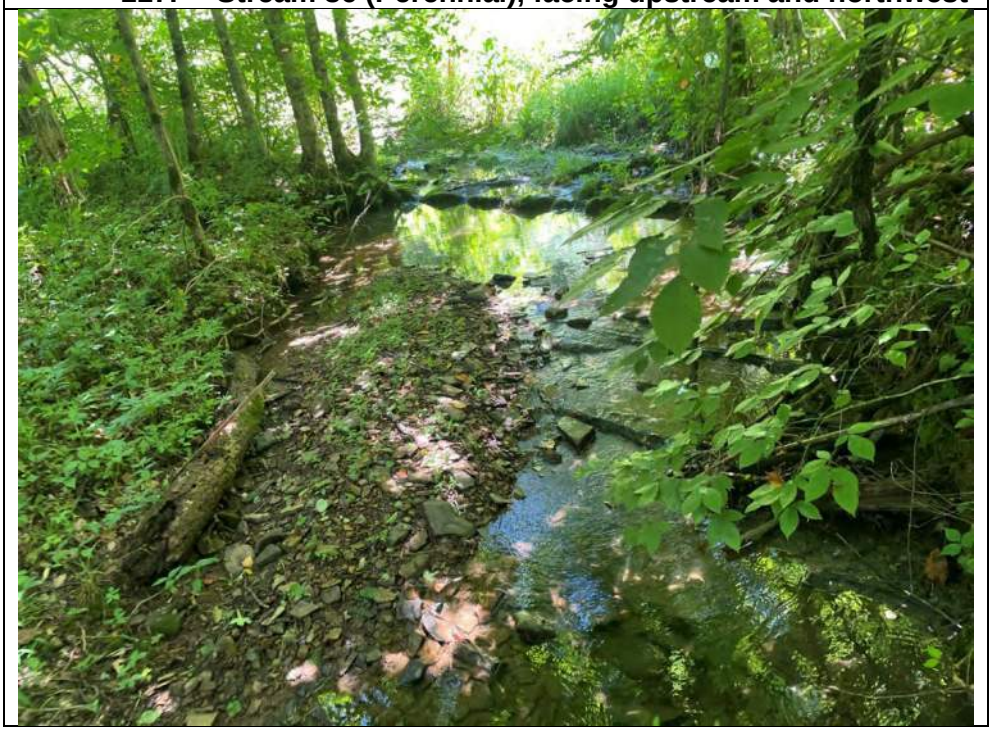
115. Stream 35 (Intermittent), facing upstream and northwest

Latitude	35.960725º
Longitude	-84.353002°
Photo Direction	SE
Date Stamp	6/7/2022

116. Stream 35 (intermittent), facing downstream and southeast

Latitude	35.963929º
Longitude	-84.350014°
Photo Direction	NW
Date Stamp	6/7/2022

117. Stream 36 (Perennial), facing upstream and northwest

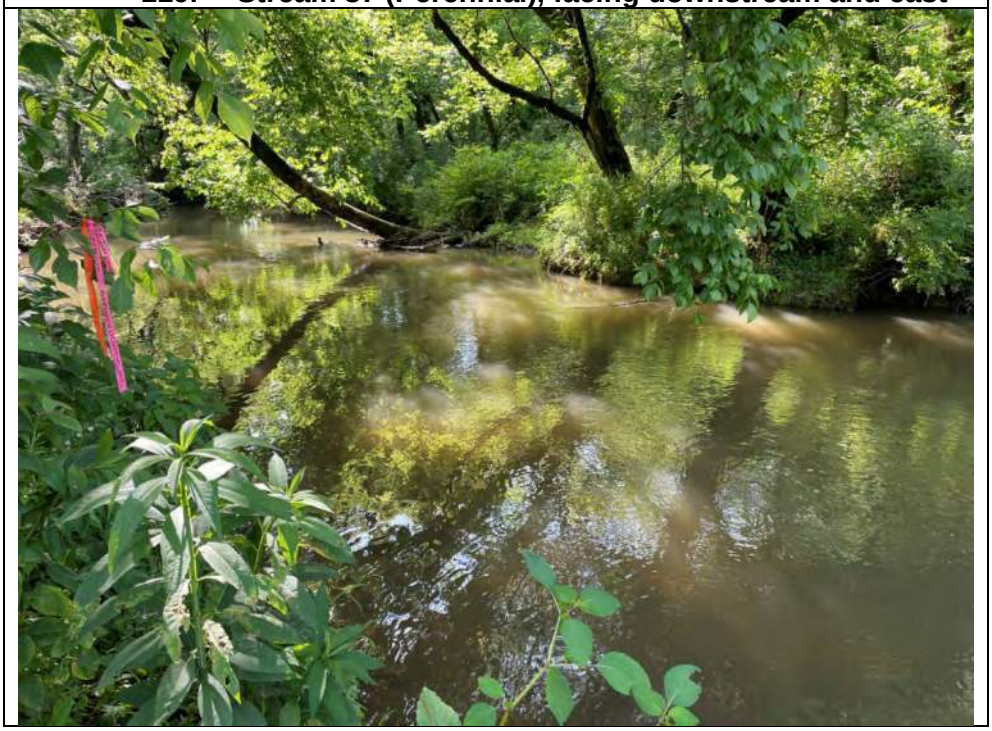


Latitude	35.963868º
Longitude	-84.349231°
Photo Direction	SE
Date Stamp	6/7/2022

118. Stream 36 (Perennial), facing downstream and southeast

Latitude	35.969979º
Longitude	-84.344442°
Photo Direction	NW
Date Stamp	6/7/2022

119. Stream 37 (Perennial), facing downstream and east



Latitude	35.969841
Longitude	-84.343701
Photo Direction	E
Date Stamp	6/6/2022

120. Stream 37 (Perennial), facing upstream and east

Latitude	35.988194º
Longitude	-84.328281°
Photo Direction	NW
Date Stamp	6/7/2022

121. Stream 38 (Intermittent), facing upstream and northwest

Latitude	35.987205º
Longitude	-84.328934°
Photo Direction	W
Date Stamp	6/21/2022

122. Stream 38 (Perennial), facing downstream and east

Latitude	35.987302º
Longitude	-84.329137°
Photo Direction	SE
Date Stamp	6/7/2022

123. Stream 39 (Intermittent), facing downstream and southeast

Latitude	35.987438°
Longitude	-84.329577°
Photo Direction	NW
Date Stamp	6/7/2022

124. Stream 39 (Intermittent), facing upstream and northwest

Latitude	35.989420º
Longitude	-84.327300°
Photo Direction	N
Date Stamp	6/7/2022

125. Stream 40 (Intermittent), facing upstream and north

Latitude	35.989547º
Longitude	-84.327378
Photo Direction	S
Date Stamp	6/7/2022

126. Stream 40 (Intermittent), facing downstream and south

Latitude	35.993695º
Longitude	-84.323042°
Photo Direction	NE
Date Stamp	6/6/2022

127. Stream 41 (Intermittent), facing upstream and northeast

Latitude	35.994171º
Longitude	-84.323243°
Photo Direction	SW
Date Stamp	6/6/2022

128. Stream 41 (Intermittent), facing downstream and southwest

Latitude	35.999113º
Longitude	-84.318053°
Photo Direction	E
Date Stamp	6/6/2022

129. Stream 42 (Intermittent), facing downstream and east

Latitude	35.999178º
Longitude	-84.318350°
Photo Direction	E
Date Stamp	6/6/2022

130. Stream 42 (Intermittent), facing downstream and east

Latitude	35.999178º
Longitude	-84.318350
Photo Direction	NW
Date Stamp	6/6/2022

131. Stream 43 (Intermittent), facing upstream and northwest

Latitude	36.023686º
Longitude	-84.294954°
Photo Direction	NW
Date Stamp	6/6/2022

132. Stream 44 (Brushy Creek, Perennial), facing upstream and northwest

Latitude	36.023742º
Longitude	-84.295646°
Photo Direction	SE
Date Stamp	6/6/2022

133. Stream 44 (Brushy Fork, Perennial), facing downstream and southeast

Latitude	36.024897º
Longitude	-84.292694°
Photo Direction	S
Date Stamp	6/5/2022

134. Stream 45 (Brushy Fork, Perennial), facing downstream and south

Latitude	36.024555 º
Longitude	-84.292550°
Photo Direction	N
Date Stamp	6/5/2022

135. Stream 45 (Brushy Fork, Perennial), facing upstream and north

Latitude	36.022324º
Longitude	-84.287646°
Photo Direction	NE
Date Stamp	6/5/2022

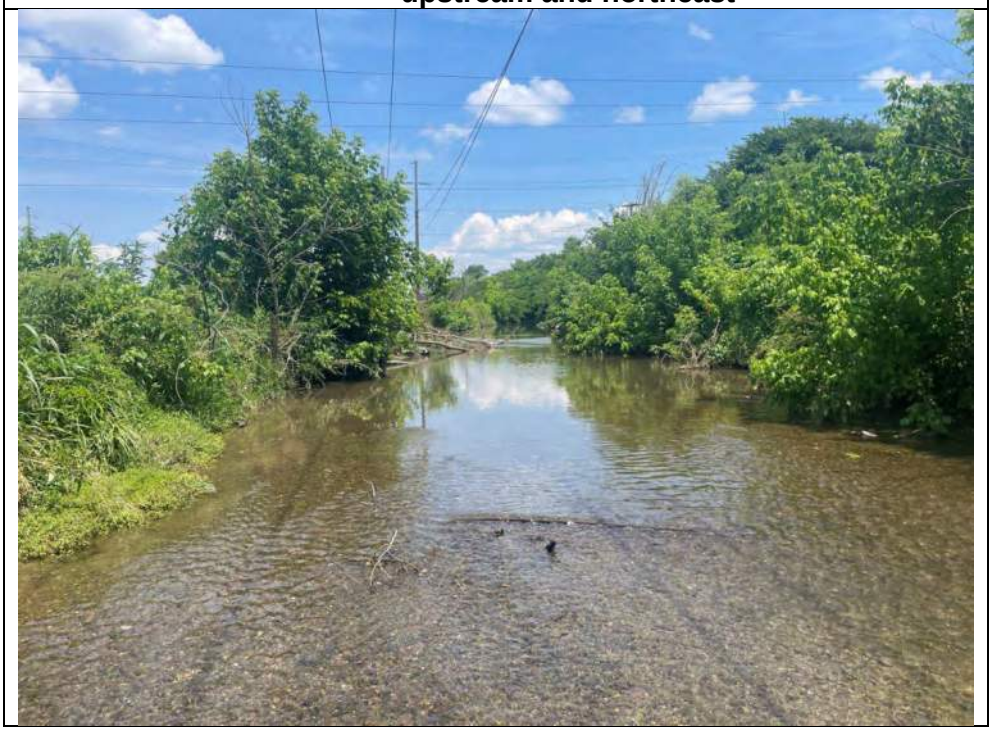
136. Stream 46 (Perennial), facing downstream and northeast

Latitude	36.021971º
Longitude	-84.287806°
Photo Direction	E
Date Stamp	6/5/2022

137. Stream 46 (Perennial), facing upstream and east

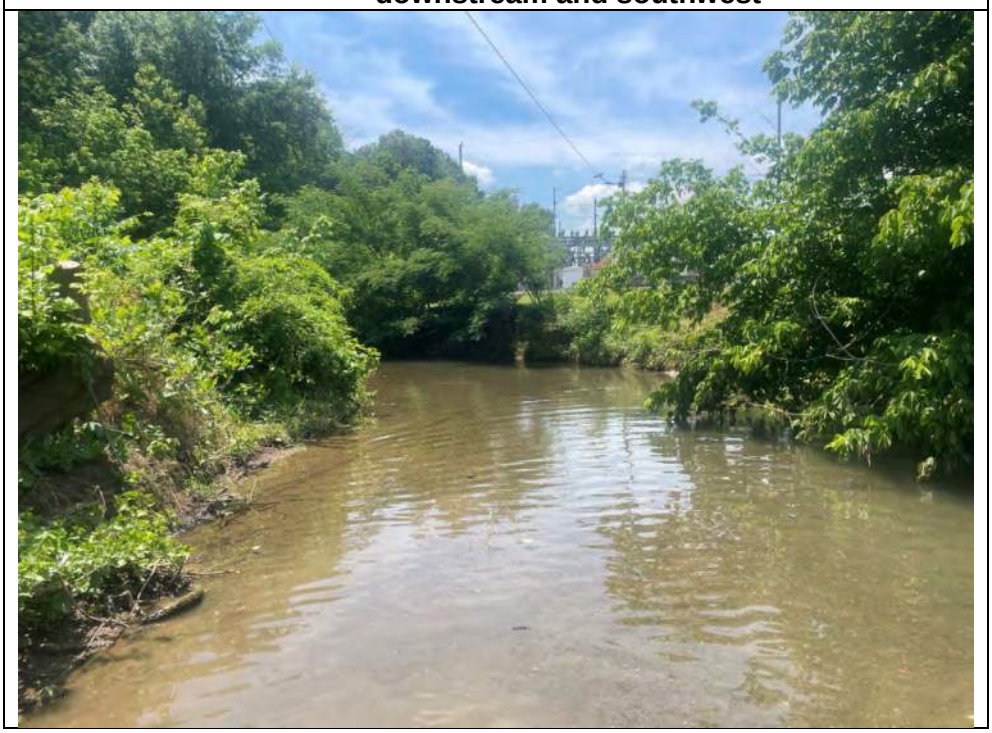
Latitude	36.009449º
Longitude	-84.269993°
Photo Direction	NE
Date Stamp	6/5/2022

138. Stream 47 (East Fork Poplar Creek, Perennial), facing upstream and northeast



Latitude	36.009372º
Longitude	-84.270537°
Photo Direction	SW
Date Stamp	6/5/2022

139. Stream 47 (East Fork Poplar Creek, Perennial), facing downstream and southwest



Latitude	36.003203º
Longitude	-84.263526°
Photo Direction	NE
Date Stamp	6/5/2022

140. Stream 48 (East Fork Poplar Creek, Perennial), facing upstream and northeast

Latitude	36.002811º
Longitude	-84.263639°
Photo Direction	SW
Date Stamp	6/5/2022

141. Stream 48 (East Fork Poplar Creek, Perennial), facing downstream and southwest

Latitude	36.002894º
Longitude	-84.263457°
Photo Direction	SE
Date Stamp	6/5/2022

142. Stream 49 (Intermittent), facing upstream and southeast

Latitude	35.923087 º
Longitude	-84.336106°
Photo Direction	SE
Date Stamp	6/19/2022

143. Stream 50b (Intermittent), facing downstream and southeast

Latitude	35.922774º
Longitude	-84.335705°
Photo Direction	NW
Date Stamp	6/19/2022

144. Stream 50b (Intermittent), facing upstream and northwest

Latitude	35.930662º
Longitude	-84.326232°
Photo Direction	NE
Date Stamp	6/19/2022

145. Stream 51 (Intermittent), facing upstream and northeast

Latitude	35.930140º
Longitude	-84.326127 °
Photo Direction	SE
Date Stamp	6/19/2022

146. Stream 51 (Intermittent), facing downstream and southeast

Latitude	35.932383º
Longitude	-84.317354°
Photo Direction	N
Date Stamp	6/19/2022

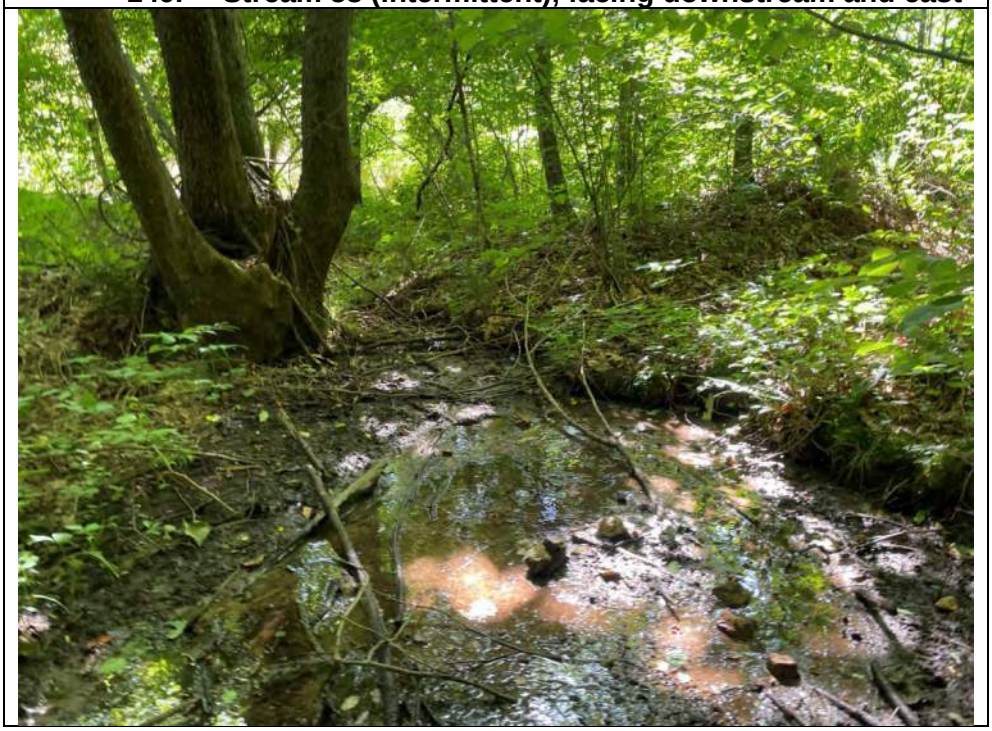
147. Stream 52 (Perennial), facing upstream and north

Latitude	35.933592º
Longitude	-84.317474 °
Photo Direction	S
Date Stamp	6/19/2022

148. Stream 52 (Perennial), facing downstream and south

Latitude	35.933405º
Longitude	-84.317652°
Photo Direction	E
Date Stamp	6/19/2022

149. Stream 53 (Intermittent), facing downstream and east



Latitude	35.933331º
Longitude	-84.317479°
Photo Direction	SW
Date Stamp	6/19/2022

150. Stream 53 (Intermittent), facing upstream and southwest

Latitude	36.002224º
Longitude	-85.014106º
Photo Direction	N
Date Stamp	6/21/2022

151. WWC 1/ Ephemeral 1, facing upstream and north

Latitude	36.002048º
Longitude	-85.014121º
Photo Direction	S
Date Stamp	6/21/2022

152. WWC 1/ Ephemeral 1, facing downstream and south

Latitude	36.001665º
Longitude	-85.012190º
Photo Direction	NW
Date Stamp	6/21/2022

153. WWC2/ Ephemeral 2, facing downstream northwest

Latitude	36.001611º
Longitude	-85.012165º
Photo Direction	SE
Date Stamp	6/21/2022

154. WWC2/ Ephemeral 2, facing upstream and southeast

Latitude	35.993222º
Longitude	-84.992164º
Photo Direction	NE
Date Stamp	6/17/2022

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155. WWC3/ Ephemeral 3, facing downstream and northeast

Latitude	35.992707°
Longitude	-84.992155º
Photo Direction	S
Date Stamp	6/17/2022

156. WWC3/ Ephemeral 3, facing upstream and south

Latitude	35.992002º
Longitude	-84.990570º
Photo Direction	NW
Date Stamp	6/17/2022

157. WWC4/ Ephemeral 4, facing upstream and northwest

Latitude	35.912327º
Longitude	-84.481701º
Photo Direction	NW
Date Stamp	6/20/2022

158. WWC5/Ephemeral 5, facing upstream and northwest

Latitude	35.913840º
Longitude	-84.479815º
Photo Direction	SW
Date Stamp	6/20/2022

159. WWC5/Ephemeral 5, facing downstream and southwest

Latitude	35.917849º
Longitude	-84.468907º
Photo Direction	S
Date Stamp	6/21/2022

160. WWC6/ Ephemeral 6, facing downstream and south

Latitude	35.917542º
Longitude	-84.468861º
Photo Direction	N
Date Stamp	6/21/2022

161. WWC6/ Ephemeral 6, facing upstream and north

Latitude	35.920213º
Longitude	-84.458002º
Photo Direction	NW
Date Stamp	6/21/2022

162. WWC7/ Ephemeral 7, facing upstream and northwest

Latitude	35.920158º
Longitude	-84.458075º
Photo Direction	NW
Date Stamp	6/21/2022

163. WWC7/ Ephemeral 7, facing upstream and northwest

Latitude	35.944089º
Longitude	-84.400698º
Photo Direction	SW
Date Stamp	6/23/2022

164. WWC14/ Ephemeral 8

Latitude	35.949365º
Longitude	-84.376639º
Photo Direction	SE
Date Stamp	6/10/2022

165. WWC15/ Ephemeral 9, facing downstream and southeast

Latitude	35.949365º
Longitude	-84.376639º
Photo Direction	N
Date Stamp	6/10/2022

166. WWC15/ Ephemeral 9, facing downstream and north

Latitude	35.989159º
Longitude	-84.327734º
Photo Direction	NE
Date Stamp	6/9/2022

167. WWC22/ Ephemeral 11, facing upstream and northeast

Latitude	35.989461º
Longitude	-84.327435º
Photo Direction	SW
Date Stamp	6/9/2022

168. WWC22/ Ephemeral 11, facing downstream and southwest

Latitude	35.996467º
Longitude	-84.320449º
Photo Direction	NW
Date Stamp	6/8/2022

169. WWC24/Ephemeral 12 facing upstream and northwest

Latitude	35.996642º
Longitude	-84.320707º
Photo Direction	SE
Date Stamp	6/8/2022

170. WWC24/Ephemeral 12, facing downstream and southeast

Latitude	36.001940º
Longitude	-84.316245º
Photo Direction	SE
Date Stamp	6/8/2022

171. WWC25/Ephemeral 13, facing upstream and southeast

Latitude	36.001801º
Longitude	-84.316011º
Photo Direction	NW
Date Stamp	6/8/2022

172. WWC25/Ephemeral 13, facing downstream and northwest

Latitude	36.018182º
Longitude	-84.279217º
Photo Direction	SE
Date Stamp	6/7/2022

173. WWC30/ Ephemeral 14, facing downstream and southeast

Latitude	36.018111º
Longitude	-84.279101º
Photo Direction	NW
Date Stamp	6/7/2022

174. WWC30/ Ephemeral 14, facing upstream and northwest

Latitude	36.004762º
Longitude	-84.265852º
Photo Direction	E
Date Stamp	6/6/2022

175. WWC33/ Ephemeral 15, facing downstream and east

Latitude	36.004867º
Longitude	-84.265729º
Photo Direction	E
Date Stamp	6/6/2022

176. WWC33/ Ephemeral 15, facing downstream and east

Latitude	35.923750º
Longitude	-84.345038º
Photo Direction	SW
Date Stamp	6/21/2022

177. WWC36/ Ephemeral 16, facing downstream and southwest

Latitude	35.923493º
Longitude	-84.345500º
Photo Direction	NE
Date Stamp	6/21/2022

178. WWC36/ Ephemeral 16, facing upstream and northeast

Latitude	35.933744º
Longitude	-84.317490º
Photo Direction	N
Date Stamp	6/21/2022

179. WWC39/ Ephemeral 17, facing upstream and north

Latitude	35.933870º
Longitude	-84.317472º
Photo Direction	S
Date Stamp	6/21/2022

180. WWC39/ Ephemeral 17, facing downstream and south

Latitude	35.933275º
Longitude	-84.317558º
Photo Direction	S
Date Stamp	6/21/2022

181. WWC40/ Ephemeral 18, facing downstream and south

Latitude	35.933229º
Longitude	-84.317402º
Photo Direction	N
Date Stamp	6/21/2022

182. WWC40/ Ephemeral 18, facing upstream and north

Latitude	35.937105º
Longitude	-84.421119º
Photo Direction	S
Date Stamp	6/21/2022

183. WWC8/ Drainage Feature 1, facing downstream and south

Latitude	35.937041º
Longitude	-84.421097º
Photo Direction	N
Date Stamp	6/21/2022

184. WWC8/ Drainage Feature 1, facing upstream and north

Latitude	35.936802º
Longitude	-84.421426º
Photo Direction	E
Date Stamp	6/21/2022

185. WWC9/ Drainage Feature 2, facing downstream and east

Latitude	35.936822º
Longitude	-84.421291º
Photo Direction	W
Date Stamp	6/21/2022

186. WWC9/ Drainage Feature 2, facing upstream and west

Latitude	35.934092º
Longitude	-84.422667º
Photo Direction	SE
Date Stamp	6/21/2022

187. WWC10/ Drainage Feature 3, facing downstream and southeast

Latitude	35.934295º
Longitude	-84.422908º
Photo Direction	NW
Date Stamp	6/21/2022

188. WWC10/ Drainage Feature 3, facing upstream and northwest

Latitude	35.939393º
Longitude	-84.410313º
Photo Direction	W
Date Stamp	6/22/2022

189. WWC11/ Drainage Feature 4, facing downstream and west

Latitude	35.939423º
Longitude	-84.411181º
Photo Direction	NW
Date Stamp	6/22/2022

190. WWC11/ Drainage Feature 4, facing downstream and northwest

Latitude	35.940538º
Longitude	-84.413178º
Photo Direction	S
Date Stamp	6/22/2022

191. WWC12/ Drainage Feature 5, facing downstream and south

Latitude	35.940621º
Longitude	-84.413693º
Photo Direction	W
Date Stamp	6/22/2022

192. WWC12/ Drainage Feature 5, facing upstream and west

Latitude	35.941584º
Longitude	-84.409905º
Photo Direction	N
Date Stamp	6/22/2022

193. WWC13/ Drainage Feature 6, facing upstream and north

Latitude	35.943471º
Longitude	-84.409786º
Photo Direction	SE
Date Stamp	6/22/2022

194. WWC13/ Drainage Feature 6, looking downstream and southeast

Latitude	35.951341º
Longitude	-84.360019º
Photo Direction	SW
Date Stamp	6/9/2022

195. WWC17/ Drainage Feature 7, facing downstream and southwest

Latitude	35.951335º
Longitude	-84.360025º
Photo Direction	NE
Date Stamp	6/9/2022

196. WWC17/ Drainage Feature 7, facing upstream and northeast

Latitude	35.955798º
Longitude	-84.357793º
Photo Direction	S
Date Stamp	6/9/2022

197. WWC17a/ Drainage Feature 8

Latitude	35.955574º
Longitude	-84.357860º
Photo Direction	NW
Date Stamp	6/9/2022

198. WWC17a/ Drainage Feature 8, facing downstream and northwest

Latitude	35.973284º
Longitude	-84.340817º
Photo Direction	NE
Date Stamp	6/9/2022

199. WWC18/ Drainage Feature 9, facing upstream and northeast

Latitude	35.973250º
Longitude	-84.340878º
Photo Direction	SW
Date Stamp	6/9/2022

200. WWC18/Drainage Feature 9, facing downstream and southwest

Latitude	35.972470º
Longitude	-84.341382º
Photo Direction	SW
Date Stamp	6/8/2022

201. WWC19/ Drainage Feature 10, facing downstream and southwest

Latitude	35.972470º
Longitude	-84.341382º
Photo Direction	NE
Date Stamp	6/8/2022

202. WWC19/ Drainage Feature 10, facing upstream and northeast

Latitude	35.989145º
Longitude	-84.327701º
Photo Direction	SE
Date Stamp	6/9/2022

203. WWC21/ Drainage Feature 11, facing upstream and southeast

Latitude	35.989145º
Longitude	-84.327701º
Photo Direction	NW
Date Stamp	6/9/2022

204. WWC21/ Drainage Feature 11, facing downstream and northwest

Latitude	35.992170º
Longitude	-84.324660º
Photo Direction	NW
Date Stamp	6/8/2022

205. WWC23/ Drainage Feature 12, facing downstream and southeast

Latitude	35.996648°
Longitude	-84.320731º
Photo Direction	NW
Date Stamp	6/8/2022

206. WWC23/ Drainage Feature 12, facing upstream and northwest

Latitude	36.006217º
Longitude	-84.312111º
Photo Direction	NW
Date Stamp	6/8/2022

207. WWC26/ Drainage Feature 14, facing upstream northwest

Latitude	36.005977º
Longitude	-84.311940º
Photo Direction	SE
Date Stamp	6/8/2022

208. WWC26/ Drainage Feature 14, facing downstream and southeast

Latitude	36.007512º
Longitude	-84.310343º
Photo Direction	SE
Date Stamp	6/8/2022

209. WWC27/ Drainage Feature 15, facing downstream and southeast

Latitude	36.007641º
Longitude	-84.310370º
Photo Direction	NW
Date Stamp	6/8/2022

210. WWC27/ Drainage Feature 15, facing upstream and northwest

Latitude	36.018912º
Longitude	-84.299864º
Photo Direction	S
Date Stamp	6/7/2022

211. WWC28/ Drainage Feature 16, facing upstream and south

Latitude	36.018675º
Longitude	-84.299778º
Photo Direction	N
Date Stamp	6/7/2022

212. WWC28/ Drainage Feature 16, facing downstream and north

Latitude	36.025986º
Longitude	-84.294582º
Photo Direction	W
Date Stamp	6/7/2022

213. WWC29/ Drainage Feature 17, facing upstream and west

Latitude	36.015559º
Longitude	-84.275742º
Photo Direction	E
Date Stamp	6/6/2022

214. WWC31/Drainage Feature 18, facing upstream and east

Latitude	36.015516º
Longitude	-84.276062º
Photo Direction	W
Date Stamp	6/6/2022

215. WWC31/Drainage Feature 18, facing downstream west

Latitude	36.010572º
Longitude	-84.271491º
Photo Direction	NE
Date Stamp	6/6/2022

216. WWC32/Drainage Feature 19, facing upstream and northeast

Latitude	36.010641º
Longitude	-84.271454º
Photo Direction	SW
Date Stamp	6/6/2022

217. WWC32/Drainage Feature 19, facing downstream and southwest

Latitude	36.001073º
Longitude	-84.261043º
Photo Direction	SW
Date Stamp	6/6/2022

218. WWC34/ Drainage Feature 20, facing downstream and southwest

Latitude	36.001073º
Longitude	-84.261043º
Photo Direction	NE
Date Stamp	6/6/2022

219. WWC34/ Drainage Feature 20, facing upstream and northeast

Latitude	35.999292 º
Longitude	-84.257671 º
Photo Direction	N
Date Stamp	6/6/2022

220. WWC35/ Drainage Feature 21, facing upstream and north

Latitude	35.999025º
Longitude	-84.257671º
Photo Direction	S
Date Stamp	6/6/2022

221. WWC35/ Drainage Feature 21, facing downstream and south

Latitude	35.923554º
Longitude	-84.335052º
Photo Direction	N
Date Stamp	6/20/2022

222. WWC37/ Drainage Feature 22, facing upstream and north

Latitude	35.923475º
Longitude	-84.335078º
Photo Direction	S
Date Stamp	6/20/2022

223. WWC37/ Drainage Feature 22, facing downstream and south

Latitude	35.926594º
Longitude	-84.330692º
Photo Direction	SE
Date Stamp	6/20/2022

224. WWC38/ Drainage Feature 23, facing downstream and southeast

Latitude	35.926712º
Longitude	-84.330888º
Photo Direction	NW
Date Stamp	6/20/2022

225. WWC38/ Drainage Feature 23, facing upstream and northwest

Latitude	35.947367º
Longitude	-84.367237º
Photo Direction	W
Date Stamp	6/10/2022

226. WWC16/ Upland Drainage Feature 24, facing upstream and west

Latitude	35.947291º
Longitude	-84.367041º
Photo Direction	E
Date Stamp	6/10/2022

227. WWC16/ Upland Drainage Feature 24, facing downstream and east

Latitude	35.979274º
Longitude	-84.336385º
Photo Direction	NW
Date Stamp	6/9/2022

228. WWC20/ Upland Drainage Feature 25, facing downstream and northwest

Latitude	35.979274º
Longitude	-84.336385º
Photo Direction	SE
Date Stamp	6/9/2022

229. WWC20/ Upland Drainage Feature 25, facing upstream and southeast

Latitude	36.015854º
Longitude	-85.050360º
Photo Direction	NW
Date Stamp	6/16/2022

230. Upland datapoint taken near Wetland 1 (DP2-UP1)

Latitude	36.014894º
Longitude	-85.046911º
Photo Direction	NE
Date Stamp	6/16/2022

231. Upland datapoint taken near Wetland 2 (DP5-UP2)

Latitude	36.014112º
Longitude	-85.045115º
Photo Direction	S
Date Stamp	6/13/2022

232. Upland datapoint taken near Wetland 3 (DP7-UP3)

Latitude	36.012864º
Longitude	-85.041943º
Photo Direction	W
Date Stamp	6/6/2022

233. Upland datapoint taken near Wetland 4 (DP9-UP4)

Latitude	36.008902º
Longitude	-85.031785º
Photo Direction	W
Date Stamp	6/13/2022

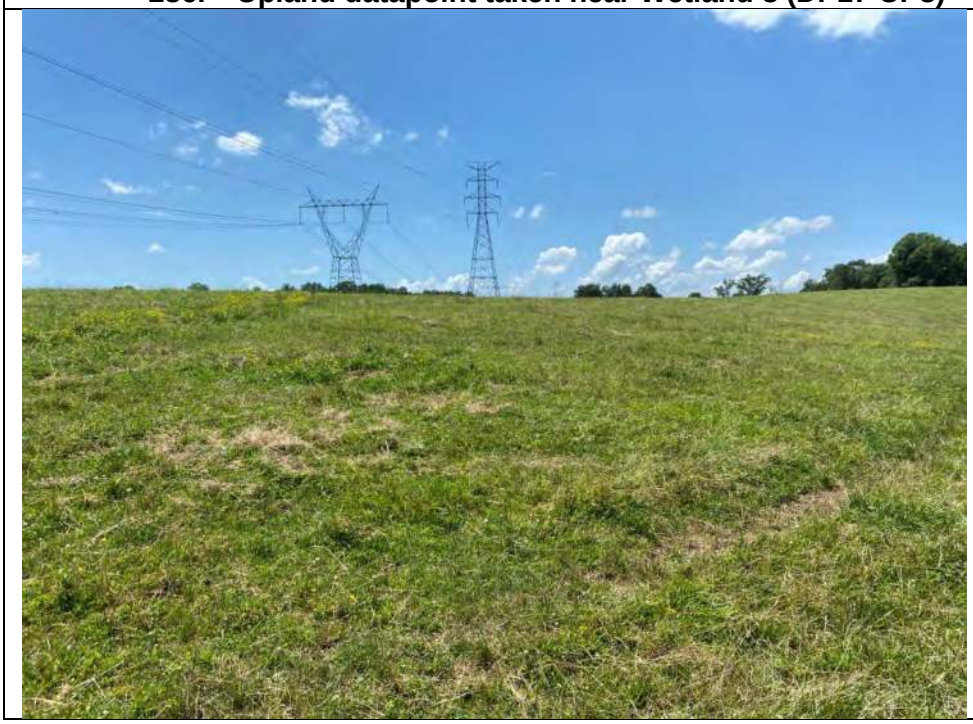
234. Upland datapoint taken near Wetland 5 (DP12-UP6)

Latitude	36.005536º
Longitude	-85.022705º
Photo Direction	W
Date Stamp	6/16/2022

235. Upland datapoint taken near Wetland 6 and Wetland 7 (DP14-UP7)

Latitude	36.003963º
Longitude	-85.017567º
Photo Direction	NW
Date Stamp	6/16/2022

236. Upland datapoint taken near Wetland 8 (DP17-UP8)



Latitude	36.001324º
Longitude	-85.012165º
Photo Direction	NW
Date Stamp	6/16/2022

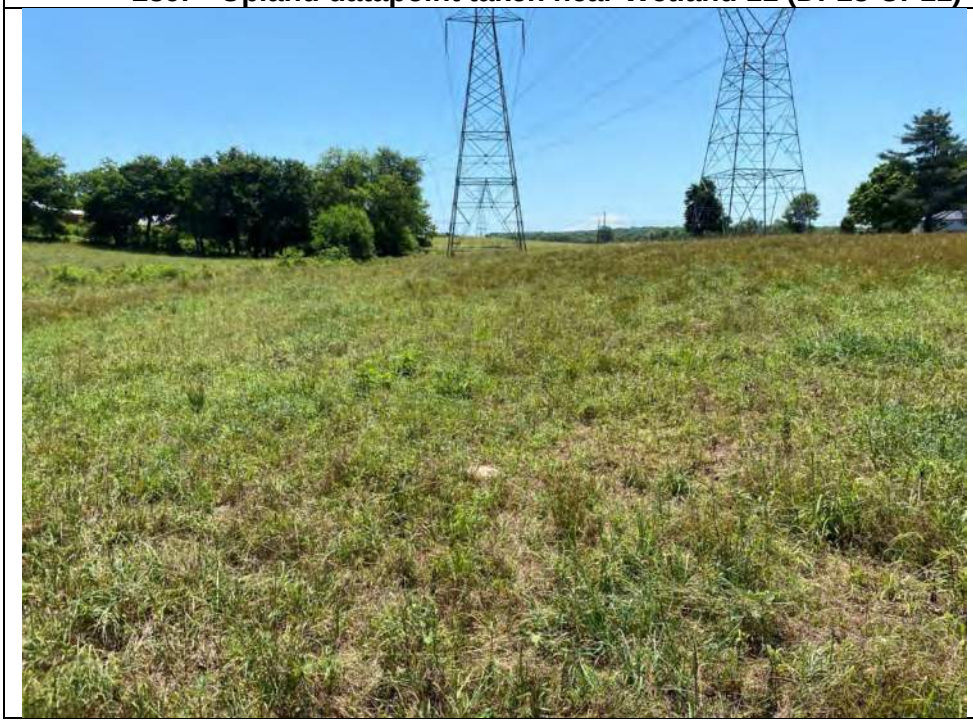
237. Upland datapoint taken near Wetland 9 (DP19-UP9)

Latitude	36.000677º
Longitude	-85.010714º
Photo Direction	NW
Date Stamp	6/16/2022

238. Upland datapoint taken near Wetland 10 (DP21-UP10)

Latitude	35.998358º
Longitude	-85.004976º
Photo Direction	NW
Date Stamp	6/16/2022

239. Upland datapoint taken near Wetland 11 (DP23-UP11)



Latitude	35.994444º
Longitude	-84.995342º
Photo Direction	SE
Date Stamp	6/16/2022

240. Upland datapoint taken near Wetland 12 (DP27-UP13)

Latitude	35.993318º
Longitude	-84.992998º
Photo Direction	N
Date Stamp	6/16/2022

241. Upland datapoint taken near Wetland 13 and Wetland 15 (DP29-UP14)

Latitude	35.992504º
Longitude	-84.991229º
Photo Direction	SE
Date Stamp	6/16/2022

242. Upland datapoint taken near Wetland 14 (DP31-UP15)

Latitude	35.989610º
Longitude	-84.984581º
Photo Direction	N
Date Stamp	6/16/2022

243. Upland datapoint taken near Wetland 16 (DP35-UP17)

Latitude	35.914274º
Longitude	-84.478799º
Photo Direction	SW
Date Stamp	6/20/2022

244. Upland datapoint taken near Wetland 17 (DP37-UP18)

Latitude	35.915629º
Longitude	-84.473809º
Photo Direction	S
Date Stamp	6/20/2022

245. Upland datapoint taken near Wetland 18 (DP39-UP19)

Latitude	35.916664º
Longitude	-84.471434º
Photo Direction	SW
Date Stamp	6/20/2022

246. Upland datapoint taken near Wetland 19 (DP41-UP20)

Latitude	35.917251º
Longitude	-84.469162º
Photo Direction	N
Date Stamp	6/21/2022

247. Upland datapoint taken near Wetland 20 (DP43-UP21)

Latitude	35.917888º
Longitude	-84.467744º
Photo Direction	W
Date Stamp	6/21/2022

248. Upland datapoint taken near Wetland 21 (DP45-UP22)

Latitude	35.919251º
Longitude	-84.464184º
Photo Direction	E
Date Stamp	6/21/2022

249. Upland datapoint taken near Wetland 22 (DP47-UP23)

Latitude	35.919283º
Longitude	-84.462140º
Photo Direction	W
Date Stamp	6/21/2022

250. Upland datapoint taken near Wetland 23 (DP49-UP24)

Latitude	35.919809º
Longitude	-84.461156º
Photo Direction	NE
Date Stamp	6/21/2022

251. Upland datapoint taken near Wetland 24 (DP51-UP25)

Latitude	35.920282º
Longitude	-84.457697º
Photo Direction	SW
Date Stamp	6/21/2022

252. Upland datapoint taken near Wetland 25 (DP53-UP26)

Latitude	35.925935º
Longitude	-84.437296º
Photo Direction	NE
Date Stamp	6/23/2022

253. Upland datapoint taken near Wetland 26 (DP55-UP27)

Latitude	35.932829º
Longitude	-84.420930º
Photo Direction	N
Date Stamp	6/23/2022

254. Upland datapoint taken near Wetland 27 (DP57-UP28)

Latitude	35.938065º
Longitude	-84.412410º
Photo Direction	N
Date Stamp	6/22/2022

255. Upland datapoint taken near Wetland 28 (DP59-UP29)

Latitude	35.927724º
Longitude	-84.402632º
Photo Direction	NW
Date Stamp	6/22/2022

256. Upland datapoint taken near Wetland 29 and Wetland 30 (DP62-UP31)

Latitude	35.936313º
Longitude	-84.411968º
Photo Direction	SW
Date Stamp	6/22/2022

257. Upland datapoint taken near Wetland 31 (DP58-W28)

Latitude	35.944664º
Longitude	-84.396365º
Photo Direction	E
Date Stamp	6/22/2022

258. **Upland datapoint taken near Wetland 32 and Wetland 33 (DP66-UP33)**

Latitude	35.947429º
Longitude	-84.387758º
Photo Direction	N
Date Stamp	6/20/2022

259. Upland datapoint taken near Wetland 34 (DP69-UP34)

Latitude	35.945929º
Longitude	-84.385159º
Photo Direction	W
Date Stamp	6/22/2022

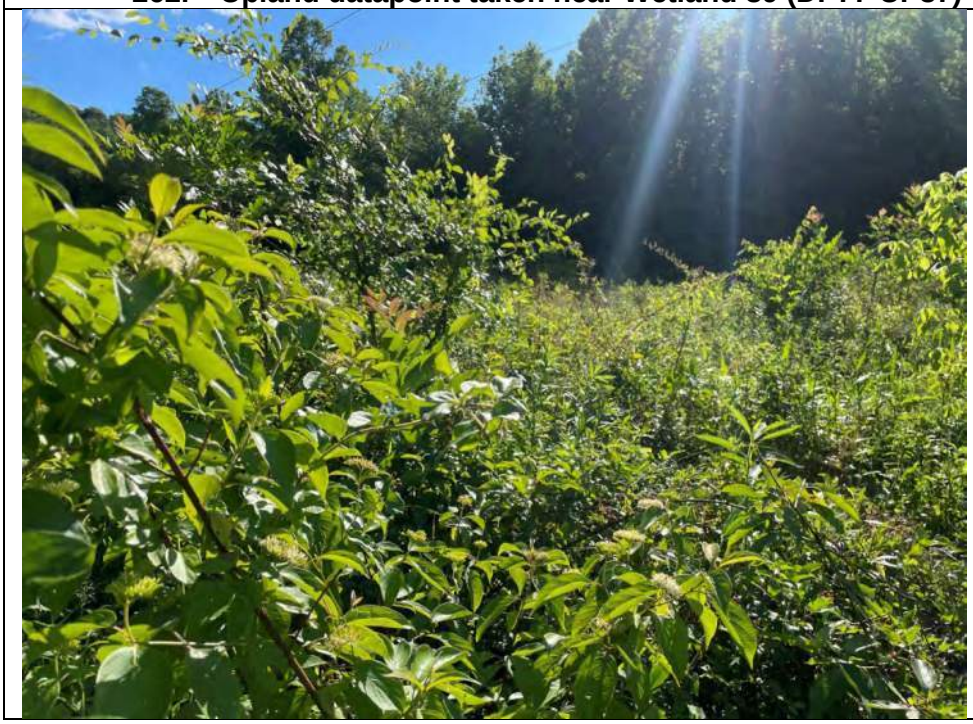
260. Upland datapoint taken near Wetland 35 (DP71-UP35)

Latitude	35.947282º
Longitude	-84.367398º
Photo Direction	S
Date Stamp	6/10/2022

261. Upland datapoint taken near Wetland 36, Wetland 37, and Wetland 38 (DP75-UP36)

Latitude	35.948122º
Longitude	-84.364633º
Photo Direction	NW
Date Stamp	6/9/2022

262. Upland datapoint taken near Wetland 39 (DP77-UP37)



Latitude	35.960412º
Longitude	-84.353096º
Photo Direction	W
Date Stamp	6/9/2022

263. Upland datapoint taken near Wetland 40 (DP79-UP38)

Latitude	35.966790º
Longitude	-84.347306º
Photo Direction	NW
Date Stamp	6/9/2022

264. Upland datapoint taken near Wetland 41 (DP83-UP40)

Latitude	35.969641º
Longitude	-84.344462º
Photo Direction	SW
Date Stamp	6/8/2022

265. Upland datapoint taken near Wetland 42 (DP85-UP41)

Latitude	36.023437º
Longitude	-84.295530º
Photo Direction	SW
Date Stamp	6/7/2022

266. Upland datapoint taken near Wetland 43 (DP87-UP42)

Latitude	36.004747º
Longitude	-84.265611º
Photo Direction	SE
Date Stamp	6/6/2022

267. Upland datapoint taken near Wetland 44 (DP88-UP43)

Latitude	36.002309º
Longitude	-84.263231º
Photo Direction	SW
Date Stamp	6/6/2022

268. Upland datapoint taken near Wetland 45 (DP88-UP43)

Latitude	35.923570º
Longitude	-84.344933º
Photo Direction	SE
Date Stamp	6/21/2022

269. Upland datapoint taken near Wetland 46 (DP95-UP47)

Latitude	35.922947º
Longitude	-84.336163º
Photo Direction	SW
Date Stamp	6/20/2022

270. Upland datapoint taken near Wetland 47 (DP97-UP48)

Latitude	35.934268º
Longitude	-84.317287º
Photo Direction	NE
Date Stamp	6/21/2022

271. Upland datapoint taken near Wetland 48 and Wetland 49 (DP99-UP49)

Latitude	35.999325º
Longitude	-85.006704º
Photo Direction	E
Date Stamp	6/16/2022

272. Stream 11 (Intermittent), facing upstream and east

Latitude	35.985475º
Longitude	-84.331274º
Photo Direction	E
Date Stamp	6/08/2022

273. Stream 37b (Intermittent), facing upstream and east

Latitude	º36.018996º
Longitude	-84.299587º
Photo Direction	SW
Date Stamp	6/07/2022

274. Stream 50a (Perennial), facing upstream and southwest

Appendix E

Soils Summary

Table 7. Soils on the Western Transmission Line Corridor

Soil Map Unit Symbol	Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of area
At	Atkins loam, frequently flooded	Not prime farmland	100	5.6	1.9%
Bo	Bonair loam, occasionally flooded	Not prime farmland	100	0.1	<0.1%
GpC	Gilpin loam, 5 to 12 percent slopes	Not prime farmland	0	8.3	2.8%
GpD	Gilpin loam, 12 to 20 percent slopes	Not prime farmland	0	6.1	2.0%
HeB	Hendon silt loam, 2 to 5 percent slopes	All areas are prime farmland	0	<0.1	<0.1%
HeC	Hendon silt loam, 5 to 12 percent slopes	Not prime farmland	0	3.8	1.3%
JsF	Jefferson-Shelocta complex, 20 to 45 percent slopes	Not prime farmland	0	5.4	1.8%
JvF	Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony	Not prime farmland	0	9.5	3.2%
Llb	Lily loam, 2 to 6 percent slopes	All areas are prime farmland	0	41.1	13.8%
LlC	Lily loam, 6 to 12 percent slopes	Not prime farmland	0	118.1	39.8%
LlD	Lily loam, 12 to 20 percent slopes	Not prime farmland	0	28.9	9.7%
LnC	Lily-Lonewood complex, 5 to 12 percent slopes, rocky	Not prime farmland	0	13.3	4.5%
LwB	Lonewood loam, 2 to 5 percent slopes	All areas are prime farmland	0	2.3	0.8%
RaC	Ramsey loam, 5 to 12 percent slopes	Not prime farmland	0	1.8	0.6%
RaD	Ramsey loam, 12 to 20 percent slopes	Not prime farmland	0	4.4	1.5%
RrC	Ramsey-Rock outcrop complex, 5 to 12 percent slopes	Not prime farmland	0	2.3	0.8%
RrD	Ramsey-Rock outcrop complex, 12 to 20 percent slopes	Not prime farmland	0	34.1	11.5%
VsE	Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky	Not prime farmland	0	8.0	2.7%
W	Water	Not prime farmland	0	4.0	1.4%
	Total Prime Farmland			**43.4**	**14.6%**

Table 8. Soils on the Eastern Transmission Line Corridor

Soil Map Unit Symbol	Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of area
AkD	Armuchee silt loam, 12 to 20 percent slopes	Not prime farmland	0	7.1	0.7%
AkE	Armuchee silt loam, 20 to 35 percent slopes	Not prime farmland	0	0.9	0.1%
AmC	Armuchee silt loam, 5 to 12 percent slopes	Not prime farmland	0	19.4	1.9%
AoD2	Armuchee channery silty clay loam, 12 to 20 percent slopes, eroded	Not prime farmland	0	0.4	<0.1%
AoE2	Armuchee channery silty clay loam, 20 to 35 percent slopes, eroded	Not prime farmland	0	2.1	0.2%
ApE	Armuchee-Montevallo complex, 25 to 60 percent slopes	Not prime farmland	0	0.6	0.1%
CaB	Capshaw silt loam, 2 to 5 percent slopes	All areas are prime farmland	6	9.9	0.9%
CbD	Colbert-Lyerly-Rock outcrop complex, 5 to 20 percent slopes	Not prime farmland	1	13.6	1.3%
Cd	Cedarbluff loam, 0 to 3 percent slopes, occasionally flooded	Prime farmland if drained	2	0.7	0.1%
Ce	Chenneby silt loam, frequently flooded	Prime farmland if protected from flooding or not frequently flooded during the growing season	5	1.5	0.1%
ChC3	Collegedale clay, 5 to 12 percent slopes, severely eroded	Not prime farmland	0	2.3	0.2%
ChD3	Collegedale clay, 12 to 20 percent slopes, severely eroded	Not prime farmland	0	0.5	<0.1%
CoC	Collegedale silt loam, 5 to 12 percent slopes	Not prime farmland	0	3.4	0.3%
CoD	Collegedale silt loam, 12 to 20 percent slopes	Not prime farmland	0	2.4	0.2%
DeC	Dewey silt loam, 6 to 15 percent slopes	Not prime farmland	0	23.4	2.2%
DeD	Dewey silt loam, 15 to 25 percent slopes	Not prime farmland	0	49.7	4.7%

Soil Map Unit Symbol	Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of area
DeE	Dewey silt loam, 20 to 45 percent slopes	Not prime farmland	0	46.1	4.4%
DwC	Dewey silt loam, 5 to 12 percent slopes	Not prime farmland	0	1.6	0.2%
DwD	Dewey silt loam, 12 to 20 percent slopes	Not prime farmland	0	2.6	0.2%
DwE	Dewey silt loam, 20 to 35 percent slopes	Not prime farmland	0	1.2	0.1%
EoB	Etowah loam, 2 to 5 percent slopes	All areas are prime farmland	0	3.4	0.3%
EoC	Etowah loam, 5 to 12 percent slopes	Not prime farmland	0	8.8	0.8%
FoC	Fullerton-Pailo complex, 5 to 12 percent slopes	Not prime farmland	0	16.3	1.6%
FoD	Fullerton-Pailo complex, 12 to 20 percent slopes	Not prime farmland	0	50.9	4.8%
FoE	Fullerton-Pailo complex, 20 to 35 percent slopes	Not prime farmland	0	40.6	3.9%
Hb	Hamblen silt loam, 0 to 2 percent slopes, occasionally flooded, hydric minor component	All areas are prime farmland	3	6.0	0.6%
MnC	Minvale gravelly silt loam, 5 to 12 percent slopes	Not prime farmland	0	1.3	0.1%
MnC	Minvale silt loam, 5 to 12 percent slopes	Not prime farmland	0	5.2	0.5%
MnD	Minvale silt loam, 12 to 20 percent slopes	Not prime farmland	0	4.2	0.4%
MoE	Montevallo channery silt loam, 20 to 35 percent slopes	Not prime farmland	0	17.3	1.6%
MvD	Montevallo channery silt loam, 12 to 20 percent slopes	Not prime farmland	0	0.3	<0.1%
NOTCOM	No Digital Data Available	--	0	663.4	63.3%
SfC	Salacoa silt loam, 5 to 12 percent slopes	Not prime farmland	0	10.0	1.0%
SfD	Salacoa silt loam, 12 to 20 percent slopes	Not prime farmland	0	1.3	0.1%
Sk	Shady loam, occasionally flooded	All areas are prime farmland	0	2.5	0.2%
SwB	Swafford loam, 2 to 5 percent slopes	All areas are prime farmland	0	1.4	0.1%

Soil Map Unit Symbol	Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of area
TbB	Tasso loam, 2 to 5 percent slopes	All areas are prime farmland	0	0.6	0.1%
TeD	Townley silt loam, 12 to 20 percent slopes	Not prime farmland	0	3.7	0.4%
TnC	Townley silt loam, 5 to 12 percent slopes	Not prime farmland	0	0.6	0.1%
Ur	Urban land	Not prime farmland	0	0.5	<0.1%
UrD	Urban land, 5 to 20 percent slopes	Not prime farmland	0	2.1	0.2%
W	Water	Not prime farmland	0	6.9	0.7%
WaC	Waynesboro loam, 6 to 15 percent slopes	Not prime farmland	0	3.3	0.3%
WaD	Waynesboro loam, 15 to 25 percent slopes	Not prime farmland	0	4.6	0.4%
Ww	Whitwell loam, 1 to 4 percent slopes, occasionally flooded	All areas are prime farmland	0	3.1	0.3%
	Total Prime Farmland			**29.1**	**2.8%**

Source: USDA 2019a