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Project Name: Optimist Solar and BESS Project
Project Number: 2021-35

OPTIMIST SOLAR AND BESS PROJECT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

Clay County, Mississippi

Prepared for:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

Submitted by:
MS Solar 7, LLC

Prepared by:
Tetra Tech, Inc.

December 2023

For further information, contact:
Brittany Kunkle
NEPA Compliance
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11B
Knoxville, Tennessee 37902-1499
E-mail: brkunkle@tva.gov

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Acronyms and Abbreviations

AC	alternating current
APE	Area of Potential Effect
BCC	Bird of Conservation Concern
BESS	battery energy storage system
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CO	Carbon Monoxide
CWA	Clean Water Act
DC	direct current
EA	Environmental Assessment
EPA	U. S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
HAPs	Hazardous Air Pollutants
hp	horsepower
IpaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
kV	kilovolt
kW	kilowatt
MBTA	Migratory Bird Protection Act
MBWG	Mississippi Bat Working Group
MDAH	Mississippi Department of Archives and History
MDEQ	Mississippi Department of Environmental Quality

MNHP	Mississippi Natural Heritage Program
MW	megawatts
MWh	megawatt hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLEB	Northern Long-eared Bat
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NSA	New South Associates
NWP	Nationwide Permit
O_3	Ozone
Origis	Origis Energy
PAB	palustrine aquatic bed
Pb	Lead
PEM	palustrine emergent
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter 2.5 microns in diameter
PM_{10}	Particulate Matter 10 microns in diameter
POI	Point of Interconnection
PPA	Power Purchase Agreement
PUB	palustrine unconsolidated bottom
PV	Photovoltaic

ROW	Right-of-way
SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
tpy	tons per year
TVA	Tennessee Valley Authority
TVARAM	Tennessee Valley Authority Rapid Assessment Method
ULSD	ultra-low sulfur diesel
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
WOTUS	Waters of the United States

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Chapter 1 – Introduction

1.1 Purpose and Need for Action

The purpose and need for the Proposed Action remain the same as those defined by the Tennessee Valley Authority (TVA) in its 2022 Final Environmental Assessment (EA) for the proposed Optimist Solar and BESS Project (hereinafter 2022 Final EA) (TVA 2022a). The proposed changes to TVA's initial proposal are intended to reduce impacts to the environment. The project would help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 Integrated Resource Plan (IRP) (TVA 2019). The project would provide cost-effective renewable energy consistent with the IRP and TVA goals.

1.1.1 Proposed Action

The Proposed Action involves two minor changes to the 2022 Final EA: first, the addition of an approximately 92-acre area to the Project Site boundary for the placement of a proposed 0.4-mile-long overhead medium-voltage collection line, which is part of the approximately 3.2-mile long combined overhead and underground medium voltage line (herein referred to as the gen-tie) connecting the photovoltaic (PV) arrays to the Project substation, depicted and described as the "Preferred Route" in the 2022 Final EA. In addition, during Project planning, Origis Energy (Origis) determined the need for a backup diesel generator at the battery energy storage system (BESS), to account for emergency power needs and/or loss of main power from the Project Point of Interconnection (POI). Impacts from the operation of small portable generators were covered in the 2022 Final EA; however, potential impacts to air quality from a large emergency backup generator are discussed in Section 3.2.3.

TVA is supplementing the analysis in the 2022 Final EA to address the potential environmental impacts associated with the revised project plan and to consider whether there is significant new information relating to the Proposed Action.

1.1.2 Background

TVA has entered into a Power Purchase Agreement (PPA) with MS Solar 7, LLC (herein referred to as "MS Solar 7"), a subsidiary of Origis, to purchase electric power and renewable energy credits generated by the proposed Optimist Solar Project (Project or Solar Facility) in Clay County, Mississippi. The Project would be constructed by MS Solar 7 and is expected to generate up to 200 megawatts (MW) of alternating current (AC) output with a 50 MW AC – 200-megawatt hour (MWh) battery energy storage system (BESS). Under the terms of the PPA between TVA and MS Solar 7, dated December 14, 2020, TVA would purchase the electric output and renewable energy credits generated by the proposed Solar Facility for an initial term of 20 years, starting at commercial operation.

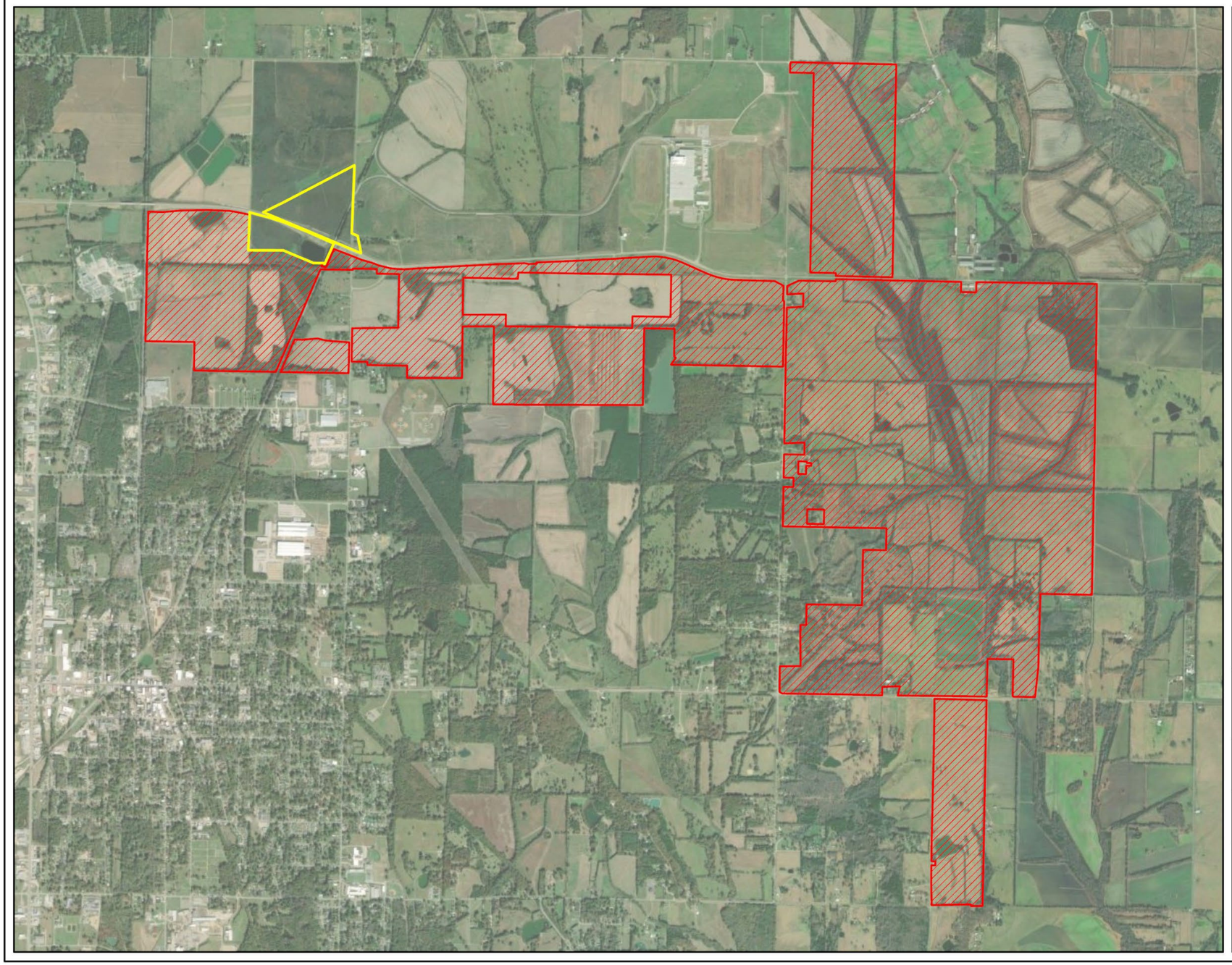
The Project Site is located approximately 1.6 miles northeast of the City of West Point, in Clay County, Mississippi (Figure 1). The proposed Project, as originally described in the 2022 Final EA, would occupy portions of 29 individual parcels, which in their entirety encompass approximately 2,952 acres of land. The Project's construction footprint would consist of multiple parallel rows containing approximately 618,000 solar photovoltaic (PV) panels on single-axis tracking structures, direct current (DC) and AC inverters, transformers, combiner boxes, switchgear, internal site access roads, substation and BESS, fencing, and other ancillary infrastructure. The generated power would be delivered to the TVA transmission system at a 161 kilovolt (kV) point of interconnection (POI) within the existing TVA West Point Substation,

via an approximately 0.5 to 1-mile-long overhead gen-tie line to be built and owned by TVA occurring from either the Project substation or a “dead end” power pole.

TVA issued the Final Optimist Solar and BESS EA and Finding of No Significant Impact (FONSI) in September 2022 (TVA 2022a, 2022b). This supplement to the 2022 Final EA was prepared to address the addition of the approximately 92-acre area to the Project Site boundary for the proposed gen-tie interconnection, and the addition of an emergency diesel generator associated with the BESS facility.

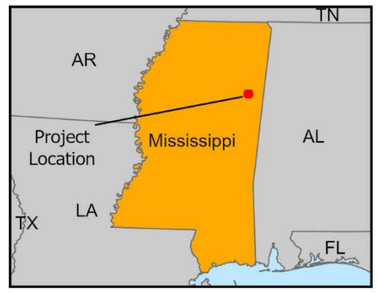
Between March and June 2023, Tetra Tech completed additional ecological surveys for the approximately 92-acre area to evaluate potential siting locations for the proposed gen-tie interconnection. Tetra Tech surveyed the newly added area for ecological resources, including wetlands, surface waters, and protected species habitat. Survey findings are summarized in subsequent sections that follow and in the *Memo: MS Solar 7 – Biological Surveys on Additional Parcels along Yokohama Boulevard*, which is provided as Appendix A (Tetra Tech 2023).

In summary, this Supplemental Environmental Assessment (SEA) addresses the proposed placement of the gen-tie route through the newly added area north of Yokohama Boulevard (Figure 2) and the addition of a large backup diesel generator. The addition of the new 92-acre area and relocation of the proposed gen-tie route will reduce Project impacts to sensitive natural resources by avoiding and minimizing impacts to streams and wetlands.



Legend

- Site Boundary
- Additional Survey Area



N

0 0.25 0.5 1 Miles

Figure 1
Project Overview
Optimist Solar Facility
Clay County, MS

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 08/2023

Source: Esri, et. al., 2023

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 16 North

Not for Construction

1.2 Other Environmental Reviews and Documentation

As noted above, this document supplements the 2022 Final EA for the original MS Solar 7 proposal. The 2022 Optimist Solar and BESS Project EA is incorporated herein by reference.

1.3 Permits, Licenses, and Approvals

TVA is the lead federal agency in the preparation of this supplemental EA. In addition to the necessary approvals from TVA, a MDEQ National Pollution Discharge Elimination System (NPDES) General Permit MSR10 would be required for discharges of stormwater associated with large (> 5 acres) construction projects (MDEQ 2022).

The Project layout was designed to avoid impacts to wetlands and streams, as no impacts are being proposed. No ordinances or requirements specific to solar and BESS facilities exist in Clay County or the City of West Point; moreover, there are no zoning regulations that apply within the unincorporated areas of Clay County, and the entirety of the proposed Project, including all improvements, structures, and components related thereto, resides within an unincorporated portion of the county. The City of West Point does have zoning regulations, although no improvements, structures, or components associated with the Project are intended to be located within parcels residing within West Point city limits. The only regulatory purview Clay County has over the Project is with respect to development within floodplains, and MS Solar 7 has a letter on file from the County Floodplain Administrator dated November 7, 2022, confirming acceptability of the development plan for the Project.

Minimal tree clearing (approximately 0.1-acre) surrounding the railroad ROW is anticipated for construction of the gen-tie line. If open burning of debris from tree clearing on the Project Site is necessary, the appropriate open burning permits would be obtained from the Mississippi Forestry Commission.

Stormwater permitting for construction for the approximately 3.2-mile-long gen-tie route to the Project substation to be constructed by MS Solar 7 would be addressed under a Notice of Intent (NOI) for the NPDES Construction Stormwater General Permit to be submitted by MS Solar 7, while stormwater permitting for the construction of the approximately 0.5 to 1-mile-long gen-tie route from the Project substation or dead-end structure to be built and owned by TVA would be addressed under a separate NOI to be submitted directly by TVA. All other construction associated with the interconnection would take place within the existing West Point Substation.

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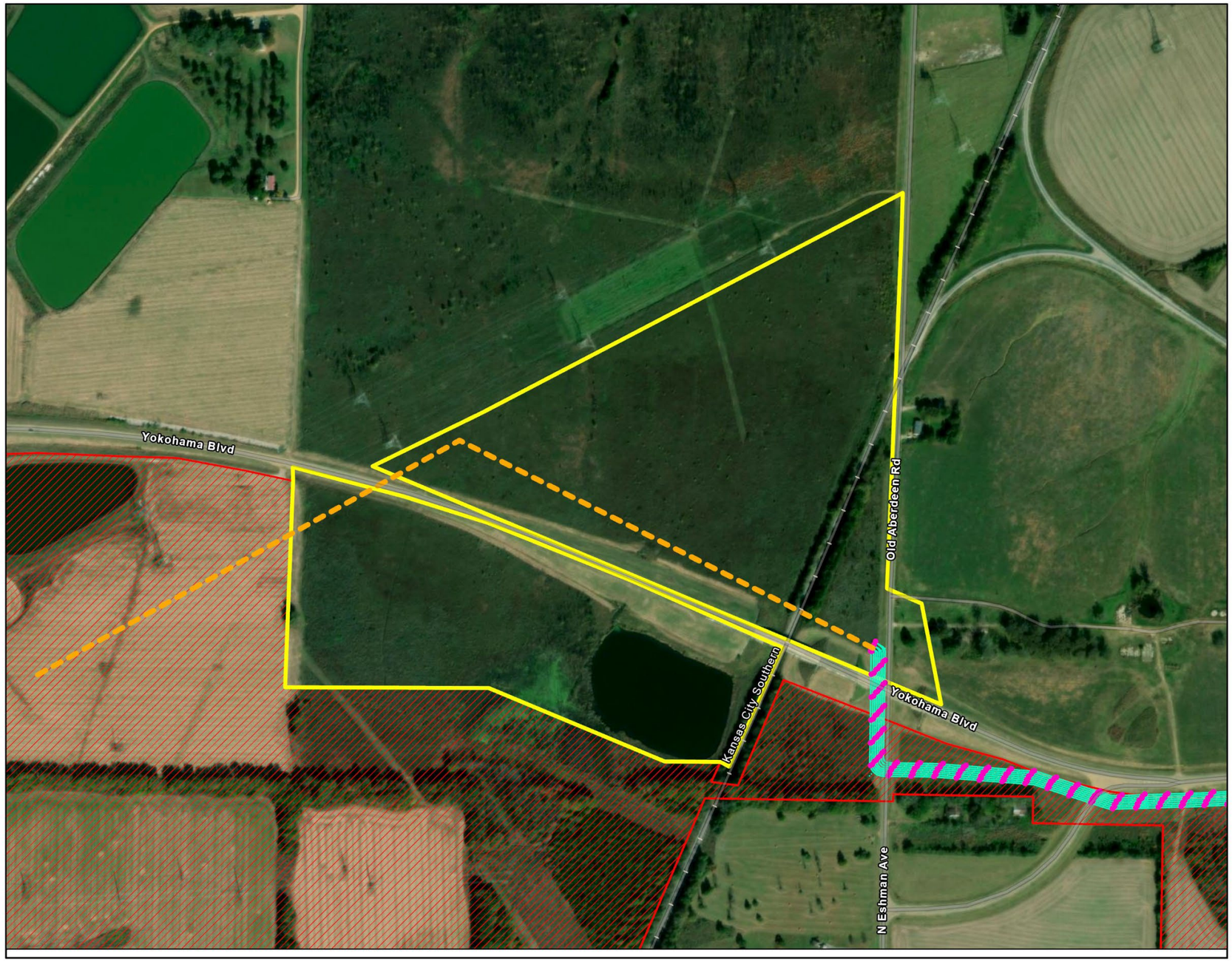
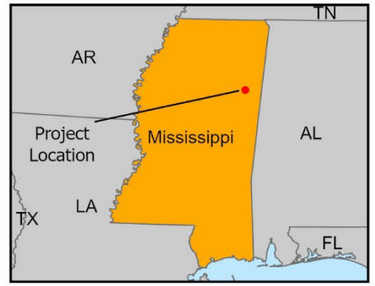


Legend

- Site Boundary
- Additional Survey Area
- Underground Collection Line
- Overhead Collection Line
- Structure



N

0 205 410 820 Feet

Figure 2
Project Infrastructure
Optimist Solar Facility
Clay County, MS

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 11/2023

Source: Esri, et. al., 2023; Origis, 2023

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 16 North

Not for Construction

Chapter 2 – Description of Alternatives

2.1 Alternatives

2.1.1 No Action Alternative

Under the No Action Alternative, TVA would continue to implement the Project as described in the 2022 Final EA. One gen-tie route would be chosen from the three previously proposed options and environmental impacts would remain the same as described in the 2022 Final EA. The backup generator would not be installed, and the impacts would remain the same.

2.1.2 Proposed Action Alternative

Under the Proposed Action Alternative, MS Solar 7 proposes a modification to the preferred gen-tie route discussed in the 2022 Final EA and the addition of an emergency backup generator. The gen-tie route would connect to the underground collection line north of Yokohama Boulevard, continue northwest, then cross southwest back over Yokohama Boulevard to a dead-end pole located in an upland area. The generator would provide emergency backup power for the BESS in the event of power loss and other emergency power needs. The proposed location of the backup generator is within the Project Site previously assessed in the 2022 Final EA. The installation and operation of the backup generator would have insignificant, localized impacts on air quality.

2.1.3 Preferred Alternative

TVA's preferred alternative is the Proposed Action Alternative, the development of the MS Solar 7 Solar Facility with the modified gen-tie route, not previously analyzed, and the installation and operation of a backup generator. This alternative would generate renewable energy with only minor direct and indirect environmental impacts due to the implementation of Best Management Practices (BMPs) and minimization and mitigation efforts. The No Action Alternative is discussed and analyzed as an alternative to the Proposed Action Alternative. Environmental impacts associated with the preferred alternative would be minor compared to impacts associated with the No Action Alternative. The Proposed Action Alternative is the preferred alternative because it best suits the purpose and need of meeting TVA's renewable energy goals and customer-driven energy demands on the TVA system, while reducing potential impacts to sensitive resources.

2.2 Comparison of Alternatives

Table 1 compares the impacts of the No Action Alternative and the Proposed Action Alternative. As noted above, impacts from implementing the No Action Alternative have been addressed by TVA in the 2022 Final EA analysis of its solar development proposal. The comparison of impacts is limited only to those resources and issues that would be potentially impacted by modifications proposed to the MS Solar 7 Project.

Table 1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts from the No Action Alternative	Potential Impacts from the Proposed Action Alternative
Water Resources	No direct or indirect impacts to the 92-acre area.	Wetlands: Minor, temporary, indirect impacts to wetlands are anticipated during the construction phase of the proposed overhead gen-tie route. No direct impacts to wetlands are anticipated.
Biological Resources	No direct or indirect impacts to the 92-acre area.	Vegetation: Minor direct impacts to vegetation by clearing within the portion of the Project Site proposed for gen-tie development and revegetating this portion of the Project Site. Maintenance of vegetation within the gen-tie ROW in the form of mowing will be practiced after construction of the Project.
		Wildlife: Minor adverse impacts to common species due to changes to habitat during construction. The Project is not anticipated to significantly affect populations of migratory birds. Impacts to nesting species of concern would be mitigated to an extent by the proposed restrictions on tree clearing during the northern long-eared bat (NLEB) pup season (June 1 – July 31).
		Rare, Threatened and Endangered Species: A small amount (0.112-acre) of potential bat roosting habitat will be cleared along the railroad ROW; however, the impacts of removing such a small portion of habitat are anticipated to be negligible to the tricolored bat, NLEB, and Rafinesque's big-eared bat. Additionally, with seasonal restrictions on tree removal in suitable bat habitat and use of BMPs, the Project is not expected to significantly affect federally or state-listed species.
Air Quality and Greenhouse Gas Emissions	No direct or indirect impacts to the 92-acre area.	Air Quality: Insignificant, direct impacts on air quality could occur during site preparation involving heavy, earth moving construction equipment (temporary emissions), and from small portable generators. There would be insignificant, short-term impacts to air quality from the operation of an emergency diesel generator during facility operations.
Cultural Resources	No direct or indirect impacts to the 92-acre area.	Archaeological Resources: No impacts on any National Register of Historic Places (NRHP)-listed or eligible archaeological sites.
		Architectural Resources: No adverse effect on architectural resources.

2.3 Best Management Practices and Mitigation Measures

The commitments and mitigation measures listed in Section 2.4 of the 2022 Final EA would remain in effect. No changes would be made to the previously discussed mitigation measures from the 2022 Final EA.

Chapter 3 – Affected Environment and Environmental Consequences

3.1 Affected Environment and Anticipated Impacts

3.1.1 Site Description

The newly added 92-acre area assessed to support the proposed 0.4-mile modification to the Preferred gen-tie route consists of one parcel divided north and south by Yokohama Boulevard into two main areas: a 35-acre area south of Yokohama Boulevard and a 57-acre area north of Yokohama Boulevard (Figure 2).

Land cover within the 35-acre area south of Yokohama Boulevard is largely composed of old fields (fields transitioning post-agricultural production) wetlands, a large pond, and small upland forests. A large pond and associated depressional wetlands occupy most of the area. The pond and depressional wetlands are assumed to have been formed and/or altered from past construction of Yokohama Boulevard and hydrological manipulation by beavers. Upland forested habitat included a narrow band along the railroad that crosses in a general northeast-southwest direction along the eastern boundary. The area appeared to have been burned since the last growing season and about a third of the area was vegetatively bare in 2023.

The 57-acre area north of Yokohama Boulevard is bounded to the west by an overhead electrical transmission (500-kV) line and is bounded to the south by Yokohama Boulevard. A railroad transects the eastern portion of the area in a general northeast-southwest direction. Land cover within the area generally consisted of old fields with a few scattered tree saplings, upland forest, and a small depressional wetland. Mature trees were observed in the upland forested community present along the railroad right-of-way (ROW). There was evidence of prescribed burning in 2023.

The proposed location of the backup generator is within the BESS Option A footprint, previously described in the 2022 Final EA (TVA 2022a).

3.2 Impacts Evaluated

Based on a review of the Proposed Action and analyses in the 2022 Final EA, TVA has identified four environmental resources or issues that will be addressed in the Supplemental EA: Water Resources (wetlands and surface water), Biological Resources, Air Quality, and Cultural Resources.

TVA determined there would be no impacts, or that potential impacts would be negligible or temporary, for most resource areas, or that the 2022 Final EA fully addresses potential impacts to the following resources areas:

- Land use;
- Geology, soils, and prime farmland;
- Water resources (groundwater and floodplains);
- Biological resources (natural areas);
- Visual resources;
- Noise;
- Air quality (greenhouse gas emissions);
- Utilities;
- Waste management;

- Public and occupational health safety;
- Transportation;
- Socioeconomics and community resources; and
- Environmental justice.

3.2.1 Water Resources

This section describes the existing water resources of the Project Site and the potential impacts to those resources that would be associated with the No Action and Proposed Action Alternatives. The water resources of interest are surface waters and wetlands.

3.2.1.1 Affected Environment

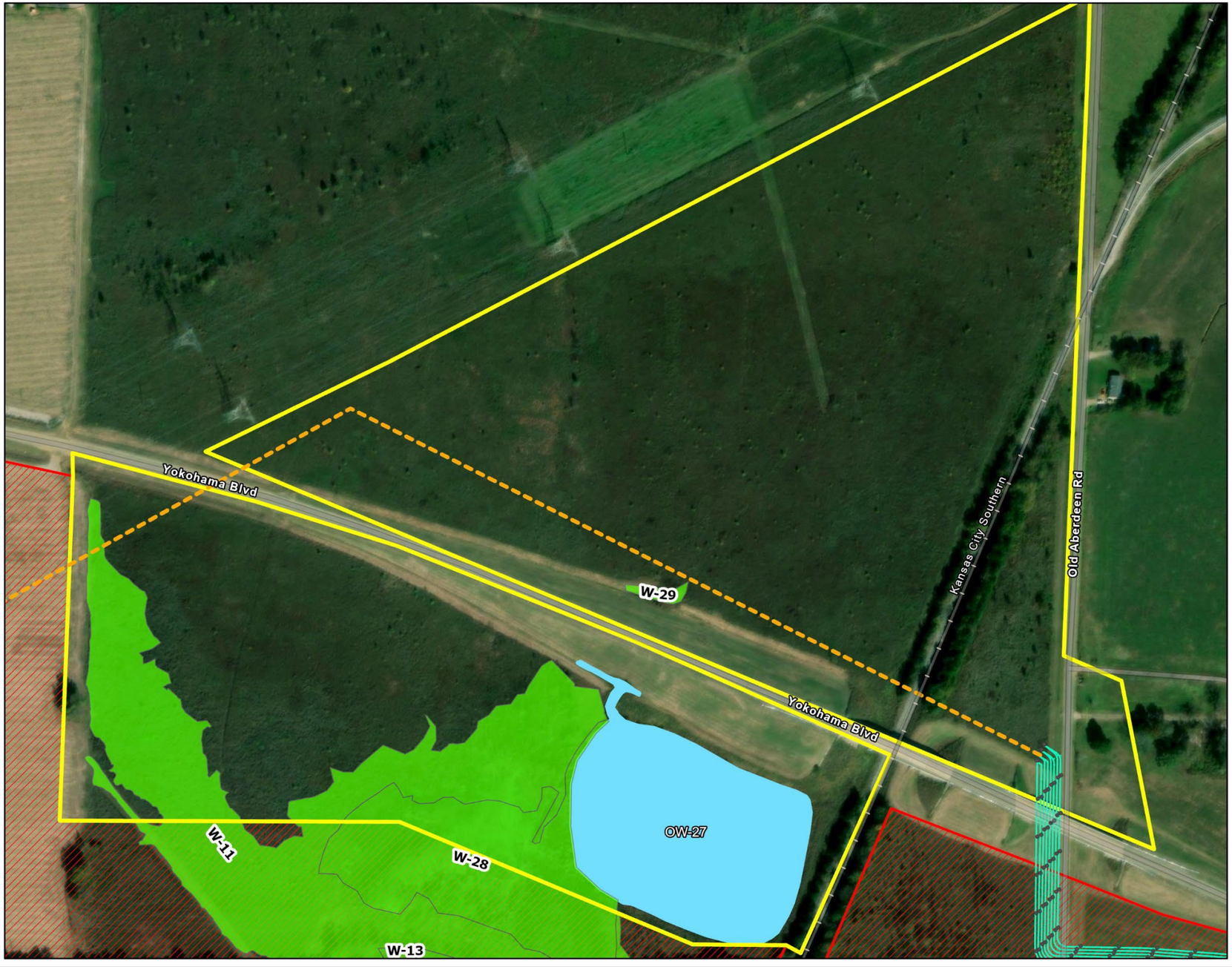
Surface Waters and Wetlands

Formal wetland delineations were conducted for the additional 92-acre area by Tetra Tech biologists between March and June of 2023. The wetland delineations followed the methodology in the *USACE Wetland Delineation Manual* (USACE 1987) and the *Regional Supplement to the USACE Wetland Delineation Manual: Atlantic Gulf Coastal Plain* (Version 2.0) (USACE 2010). Wetlands identified within the Project Site were categorized following the Cowardin classification system (Cowardin et al. 1979). Streams and waterbodies were mapped along their ordinary high-water marks. Additionally, delineated wetlands were evaluated by their functions using the TVA Rapid Assessment Method (TVARAM) (TVA 2020).

The field-based delineation identified two palustrine emergent (PEM) wetlands (W-11 and W-29), one palustrine aquatic bed (PAB) wetland (W-28), and one palustrine unconsolidated bottom/pond (PUB) (OW-27) within the Project Site (Tetra Tech 2023; Figure 3). The three wetlands totaled 23.56 acres and the open waterbody was determined to be 6.12 acres (Table 2). Vegetation in the PEM wetlands was dominated by peelbark St. John's wort (*Hypericum fasciculatum*), whitehead bogbutton (*Lachnocaulon anceps*), bushy bluestem (*Andropogon glomeratus*), shortbristle horned beaksedge (*Rhynchospora corniculata*), rice sedge (*Cyperus difformis*), soft rush (*Juncus effusus*), and Canada goldenrod (*Solidago canadensis*). Dominant vegetation within the PAB consisted of floating primrose-willow (*Ludwigia peploides*), long-leaf pondweed (*Potamogeton nodosus*), and blunt spikerush (*Eleocharis obtusa*).

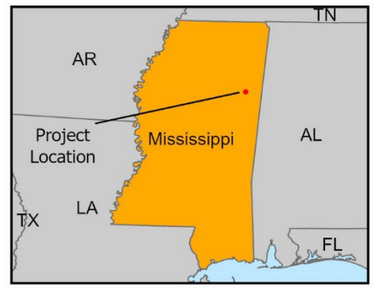
Table 2. Delineated Features within the Additional 92-acre Area

Feature ID	Delineated Acreage	Field-Verified Cowardin Classification	TVARAM Score	TVARAM Category
W-11	18.21	PEM	66	Superior
W-28	5.24	PAB	58	Moderate
W-29	0.11	PEM	25	Low
OW-27	6.12	PUB	NA	NA



Legend

- Site Boundary
- Additional Survey Area
- Underground Collection Line
- Overhead Collection Line
- Structure
- Delineated Wetland
- Delineated Open Waterbody
- Delineated Stream



N

0 125 250 500 Feet

Figure 3
Delineated Aquatics
Optimist Solar Facility
Clay County, MS

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 09/2023

Source: Esri, et. al., 2023; Origis, 2023

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 16 North

Not for Construction

3.2.1.2 Environmental Consequences

This section describes the potential impacts to water resources should the Proposed Action or No Action Alternative be implemented.

3.2.1.2.1 Alternative A – No Action

Under the No Action Alternative, MS Solar 7 would construct one of the previously proposed gen-tie routes without modification; therefore, Project-related impacts to water resources would be expected, as described in the 2022 Final EA. The 92-acre area under consideration in this SEA would not be affected.

3.2.1.2.2 Alternative B – Proposed Action

Surface Waters and Wetlands

Under the Proposed Action, minor, indirect impacts to water resources are anticipated. Due to the additional acreage added to the Project Site for the gen-tie route relocation, there would be a reduction in potential impacts to surface waters and wetlands described in the 2022 Final EA. With the newly proposed gen-tie route, the overhead collection lines would parallel Yokohama Boulevard, then veer southwest, crossing Yokohama Boulevard. The overhead collection lines would cross a small section of the edge of wetland W-11, but utility poles would be situated on higher ground so that the collection lines span the wetland. There will be no direct impacts to wetlands from construction of the overhead collection lines. Indirect impacts to wetlands and the open waterbody (OW-27) would be minor and temporary, and mitigated by the erosion control measures (BMPs) discussed in Section 2.4 of the 2022 Final EA. No direct impacts to surface water features or wetlands are anticipated. Additionally, Project facilities and supporting infrastructure have been sited to maintain a minimum 25-foot setback from all streams and wetlands.

3.2.2 Biological Resources

This section describes the existing biological resources of the Project Site and the potential impacts to those resources that would be associated with the No Action and Proposed Action Alternatives. The biological resources of interest are vegetation; rare, threatened, and endangered species; and bald eagles and migratory birds.

3.2.2.1 Affected Environment

A protected species habitat assessment and general wildlife and vegetation characterization of the ecological communities in the new 92-acre area were conducted by Tetra Tech biologists between March and June of 2023. This assessment included identifying predominant vegetative communities and suitable wildlife habitats. Unless otherwise noted, information for this section has been summarized from the *Memo: MS Solar 7 – Biological Surveys on Additional Parcels along Yokohama Blvd* (Tetra Tech 2023).

Vegetation

Observations during the 2023 field surveys verified that both areas were likely previously used for agriculture but have transitioned into old fields. The northern-most 57-acre area north of Yokohama Boulevard was dominated by upland, herbaceous plants with a few scattered sapling trees. A small area of mature trees occurs along the railroad tracks that transect the southeastern corner of this triangular parcel. The 35-acre area south of Yokohama Boulevard was a mix of upland and wetland vegetation. In this habitat, hydrophytic vegetation is

predominant and occurs within the delineated wetlands and along the pond perimeter. The only genuinely forested habitat occurs along the railroad ROW.

Herbaceous plants commonly observed throughout most of the 92-acre area include: tall goldenrod (*Solidago altissima*), Indian-hemp (*Apocynum cannabinum*), wing-angle loosestrife (*Lythrum alatum*), common ragweed (*Ambrosia artemisiifolia*), southern dewberry (*Rubus trivialis*), Brazilian vervain (*Verbena brasiliensis*), common canary grass (*Phalaris caroliniana*), tall fescue (*Lolium arundinaceum*), common brome grass (*Bromus commutatus*), ticklegrass (*Agrostis hyemalis*), ryegrass (*Lolium multiflorum*), prairie wedgescale grass (*Sphenopholis obtusata*), and little barley (*Hordeum pusillum*).

Woody plants commonly observed along the railroad ROW include: Bradford pear (*Pyrus calleryana*), smooth sumac (*Rhus glabra*), sugarberry (*Celtis laevigata*), red cedar (*Juniperus virginiana*), Chinese privet (*Lonicera sinense*), muscadine (*Vitis rotundifolia*), poison ivy (*Toxicodendron radicans*), greenbrier (*Smilax bona-nox*), Japanese honeysuckle (*Lonicera japonica*), and trumpet-creeper (*Campsis radicans*).

Wildlife and Fish

Wildlife surveys were conducted in March, May, and June 2023. Observations included nesting red-headed woodpeckers (*Melanerpes erythrocephalus*) and signs of beaver activity in wetland W-28 (Appendix B). General wildlife expected to inhabit this additional 92-acre area do not differ from those described in Table 3-3, Section 3.4.1 of the 2022 Final EA. No state or federally listed species were observed during field surveys.

Rare, Threatened, and Endangered Species

A trust resource list was obtained from the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool (USFWS 2023a; Appendix A). The query generated a list of four federally protected species that may occur within the boundary of the proposed Project and/or may be affected by the proposed Project. These species were the federally endangered northern long-eared bat (NLEB; *Myotis septentrionalis*); federally proposed threatened alligator snapping turtle (*Macrochelys temminckii*); federal candidate species monarch butterfly (*Danaus plexippus*); and federally threatened Price's potato bean (*Apios priceana*). Communication with the USFWS Mississippi Ecological Services Office revealed that the proposed endangered tricolored bat (*Perimyotis subflavus*) may also occur across the state (Personal communication; Elizabeth Hamrick, TVA).

The Mississippi Natural Heritage Program (MNHP) reported a total of eight species that have been recorded within 2-miles of the 92-acre area, two of which are protected: the grasshopper sparrow (*Ammodramus savannarum*) and the state-endangered Bewick's wren (*Thryomanes bewickii*) (MNHP 2023, Appendix A). The grasshopper sparrow has "partial status" under the Endangered Species Act because the Florida grasshopper sparrow subspecies (*Ammodramus savannarum floridanus*) is federally endangered (51 FR 27492).

A list of protected species and habitats with potential to occur in or near the 92-acre area was also obtained from TVA's Regional Natural Heritage Database, and consultations with TVA biologists were held to appropriately design methodologies for the biological surveys and assessments (TVA 2023, Appendix A). The query returned a total of 26 species with potential to occur in the Project Area, including one federally protected plant species, Price's potato bean; a federally threatened fish, the frecklebelly madtom (*Noturus munitus*); the proposed threatened (due to similarity of appearance) Alabama map turtle (*Graptemys pulchra*), and five federally

endangered mussels: southern clubshell (*Pleurobema decisum)*; ovate clubshell (*Pleurobema perovatum*); southern combshell (*Epioblasma penita*); flat pigtoe (*Pleurobema marshalli*); and stirrupshell (*Quadrula stapes*). The frecklebelly madtom is state-listed and Mississippi; however, is only federally protected where it occurs in the Upper Coosa River in Georgia and Tennessee, so the species is not federally protected in Mississippi (USFWS 2023b). The other species listed in the query were not state or federally listed. A target list of species is provided in Table 3.

Table 3. Species of Concern with Potential to Occur in or near the Project Site[1]

Common Name	Scientific Name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Mammals						
Northern long-eared bat	*Myotis septentrionalis*	E	--(S1N)	Winter hibernacula include caves or mines. During summer, spring, and fall, they will roost underneath bark in crevices of live or dead trees. Found in dense forest areas and forages in a variety of habitats; closely associated with cave structures.	Yes	No
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	--	--(S3)	Winter hibernacula include caves, rock outcrops, hollow trees, and buildings. Summer roosts include hollow trees, buildings, bridges, or culverts, in or near wooded areas.	Yes	No
Tricolored bat	*Perimyotis subflavus*	PE	--(S3/S4)	Found along forest edges, riparian areas, and open water. Roosts in caves, mines, buildings, bridges/culverts, tree cavities, and tree foliage. Hibernates in caves, mines, box culverts and rock crevices.	Yes	No
Birds						
Bewick's wren	*Thryomanes bewickii*	--	E(S1B,S1N)	Typically inhabits thickets, underbrush, gardens. Or in brushy areas around the edges of woods.	No	No
Grasshopper sparrow	*Ammodramus savannarum*	PS	--(S3B,S3N)	Found in grassland, hayfields, prairies, especially overgrown pastures, and hayfields. During migration prefers open fields.	Yes	No

Common Name	Scientific Name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Reptiles						
Alabama map turtle	*Graptemys pulchra*	PSAT	--(S2?)	Occur in medium-sized rivers to large creeks with sand bars and sturdy banks, basking sites (such as logs), and deep pools. Nests are dug in sand bars and sandy banks.	No	No
Alligator snapping turtle	*Macrochelys temminckii*	PT	--(S3)	Associated with structures (tree root masses, stumps, submerged sub-surface trees) that are found in large rivers, major tributaries, bayous, canals, swamps, lakes/ponds, oxbows, and beaver ponds. Nests in dry areas approximately 50 to 100 feet from occupied waterbodies typically between April and June.	Yes	No
Fish						
Frecklebelly madtom	*Noturus munitus*	PS:T	E(S2)	Preferred habitat is rocky riffles, rapids, and runs in small-to-large, vegetated rivers.	No	No
Mussels						
Flat pigtoe	*Pleurobema marshalli*	E	E(SX)	Occupies riffles and shoals in sandy gravel to gravel-cobble substrates with moderate to fast currents in medium to large rivers. This species once occurred in the Tombigbee River in Mississippi and Alabama but may now be extinct.	No	No
Ovate clubshell	*Pleurobema perovatum*	E	E(S1)	Occupies sand/gravel shoals and runs of small rivers and large streams. Known to occur in the Buttachatchee River and Yellow Creek in Mississippi and Alabama.	No	No

Common Name	Scientific Name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Southern clubshell	*Pleurobema decisum*	E	E(S1)	Endemic to the Mobile River Basin in Alabama, Georgia, Mississippi, and Tennessee. Occurs in large creeks/streams and rivers within gravel and sand substrates.	No	No
Southern combshell	*Epioblasma penita*	E	E(S1)	Found in riffles or shoals of medium sized rivers with sandy gravel to gravel-cobble substrates in moderate to swift current. Is now only known to occur in parts of the Buttachatchee River in Mississippi and Alabama	No	No
Stirrupshell	*Theliderma stapes*	E	E(SX)	Found in riffles and shoals on sandy gravel to gravel- cobble substrates. Requires clean flowing water. Once occurred in the Tombigbee River in Mississippi and Alabama, now presumed to be extinct.	No	No
Insects						
Monarch butterfly	*Danaus plexippus*	FC	--	Occupies fields, prairies, meadows, grasslands, and woodland edges. Typically prefers milkweed (*Asclepias* spp.) dominant fields or pastures for foraging and reproducing. The species' migration route crosses through Mississippi.	No	No
Plants						
Allegheny-spurge	*Pachysandra procumbens*	--	--(S3)	Found in rich woods with limestone substrate.	No	No
American bladdernut	*Staphylea trifolia*	--	--(S3)	Found in nutrient-rich bottomlands, woodland thickets, and moist soils along waterways.	No	No

Common Name	Scientific Name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
American ginseng	*Panax quinquefolius*	--	--(S3)	Plants occur in rich, cool, moist hardwood forests, under a closed canopy. They especially occur on slopes or ravines.	No	No
Bur oak	*Quercus macrocarpa*	--	--(S2)	Typically found on limestone or calcareous clay habitats including bottomlands, riparian slopes, prairies, and poorly drained areas.	No	No
Canada moonseed	*Menisperum canadense*	--	--(S3)	Cliffs, balds or ledges, forests.	No	No
Canada wild ginger	*Asarum canadense* var. *reflexum*	--	--(S3)	Typically found in upland rich woods with high pH soils and are associated with calcareous rock outcrops or rich soils.	No	No
Ear-flower lobelia	*Lobelia appendiculata*	--	--(S3)	Found in roadsides, fields, prairies, and grassy openings in woods.	Yes	No
Lobed tickseed	*Coreopsis auriculata*	--	--(S2/S3)	Found in wooded slopes near creeks or rivers, sandy hills.	No	No
Mountain holly	*Ilex montana*	--	--	Found in mesic forests at higher elevation with average, moist, well-drained acidic soils.	No	No
Nettle-leaf sage	*Salvia urtucufolia*	--	--(S2)	Found in dry, open woods and forest edges.	No	No
Prairie parsley	*Polytaenia nuttallii*	--	--(S2)	Found in upland prairies, hill prairies, limestone glades, chert glades, thinly wooded bluffs, and savannas.	No	No

Common Name	Scientific Name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Price's potato bean	*Apios priceana*	T	--(S1)	Habitat includes woodland edges in limestone areas, river bottoms, and roadside or powerline ROWs. Typically occurs in association with chinkapin oak (*Quercus muehlenbergii*), white ash (*Fraxinus americana*), basswood (*Tilia americana*), sugar maple (*Acer saccharum*), slippery elm (*Ulmus rubra*), redbud (*Cercis canadensis*), spicebush (*Lindera benzoin*), and switchcane (*Arundinaria tecta*).	No	No
Rugged-leaf Schlotheimia moss	*Schlotheimia rugifolia*	--	--(S3/S4)	Grows on trunks or branches of trees, often high in the canopy, usually on smooth bark and mostly on hardwoods, sometimes on logs.	No	No
Smoother sweet-cicely	*Osmorhiza longistylis*	--	--(S3)	Woodland areas with deep, moist, fertile soils.	No	No
Stemless evening-primrose	*Oenothera triloba*	--	--(S1)	Found in dry woods, barrens, and prairies. Associated with calcareous rock outcrops, glades, or dry limestone soil.	No	No
Turk's cap lily	*Lilium superbum*	--	--(S3/S4)	Found in moist meadows, woods, and coves.	No	No
White-flower beardtongue	*Penstemon tenuiflorus*	--	--(S3)	Found in dry, open woods, cedar-glades, and calcareous barrens. Thin or sandy soil, usually calcareous.	Yes	No
Wild hyacinth	*Camassia scilloides*	--	--(S2)	Found in prairies, moist forests, slopes, savannahs, glades, and woodlands at elevations of 100 to 1,000 meters.	No	No

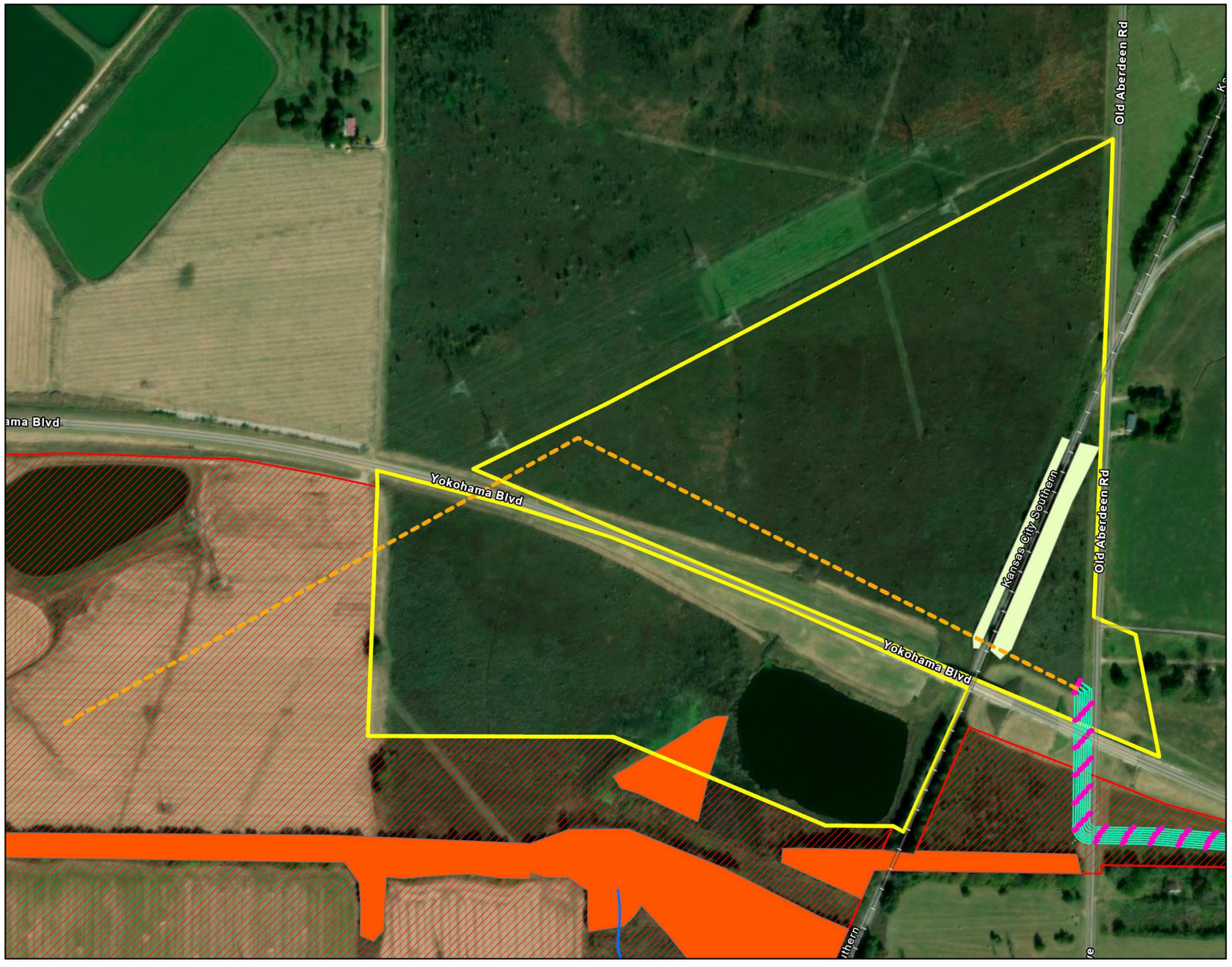
[1]Sources include USFWS IPaC; Mississippi Natural Heritage Program and spatial data request from MNHP staff; Mississippi Museum of Natural Science "Endangered Species of Mississippi"; Tennessee Valley Authority Regional Natural Heritage Database.
[2] Status: E = Endangered; T = Threatened; PS = Partial Status; PS:T = Partial Status, Threatened; PSAT = Proposed Similarity of Appearance, Threatened; PT = Proposed Threatened; FC = Federal Candidate; S# = State Rank (presumed extirpated (X), critically imperiled (1), imperiled (2), vulnerable (3), apparently secure (4), secure (5), B = breeding population, N = non-breeding).
[3]Sources include: Audubon 2023a, 2-23b; Illinois Wildflowers 2018; MMNS 2014; Missouri Botanical Garden 2023; Native Plant Trust 2023; NatureServe: 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g, 2023h, 2023i, 2023j, 2023k, 2023l, 2023m, 2023n, 2023o, 2023p, 2023q, 2023r; NC State Extension Gardener 2023a and 2023b; Office of Kentucky Nature Preserves 2018; Spaulding and Barger 2016; USFWS 2023b, 2023c; US Wildflower 2023.

The NLEB is listed as federally endangered. The Project is located within the NLEB current geographic habitat range and within the USFWS White Nose Syndrome Zone (USGS 2022). NLEBs arrive at hibernacula in August or September, begin hibernation in October and November, and leave hibernacula in March or April (78 FR 61046). During the spring, summer, and early fall, NLEBs roost in forested habitat typically within 50 miles of wintering sites (78 FR 61046). Suitable summer habitat for the NLEB has been described as "forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors" (USFWS 2020). Other important features of suitable habitat are connectivity and setting. Individual trees more than 1,000 feet from forested habitat are not considered to be suitable, nor are trees found in highly developed urban areas (USFWS 2020; 82 FR 60362). There are no known/documented NLEB hibernacula within the state of Mississippi; the only known summer roosting site is at the Tripoli Chalk Mine located approximately 60 miles north-northeast of the Project Area (MBWG 2020).

The USFWS issued a proposal to list the tricolored bat as an endangered species on September 22, 2022 (87 FR 56381) and solicited public comments, with the comment period closing on November 14, 2022. The agency received more than 200 comments from parties who raised a variety of issues, including the need for regional guidance on thresholds (minimal acreage of disturbance) for actions that may adversely affect the species (McCormick and Wortzel 2023). The status of this proposal is unknown, but the proposed rule makes clear (at 87 FR 56382) that "Based on (comments and information received), we may conclude that the species is threatened instead of endangered, or we may conclude that the species does not warrant listing as either an endangered or threatened species."

The Project is located within the tricolored bat's range, which includes most of the U.S. east of the Great Plains (USFWS 2021a). During the non-hibernating seasons (spring, summer, and fall), the tricolored bat roosts among live and dead leaf clusters of trees and/or snags, and in Spanish moss and lichen. Additionally, tricolored bats have been observed roosting in man-made structures (barns, bridges, culverts) during the summer. Winter hibernacula for the species includes caves, mines, other artificial structures, and sometimes tree cavities (USFWS 2021a).

Approximately 1.9 acres of low-quality bat habitat (consisting of species such as sugarberry and eastern red cedar) was observed along the railroad ROW north of Yokohama Boulevard, in addition to approximately 1.9 acres of high-quality bat habitat within wetland W-28 along the south project boundary (Figure 4). The forested areas along the railroad ROW and the standing dead trees within wetland W-28 may provide potentially suitable summer roosting habitat for the NLEB, Rafinesque's big eared bat, and the tricolored bat. Acoustic surveys of the original Optimist Solar site deployed eight detectors for 12 detector nights each (77 qualifying detector-nights; TVA 2022a). This level of effort was sufficient to survey 984 acres of suitable bat habitat. The original Optimist Site included approximately 513 acres of potentially suitable bat roosting habitat (ranging from low to high in quality). The additional parcels evaluated in this SEA add 3.8 acres of potentially suitable bat roosting habitat. Therefore, the level of effort met in the 2021 acoustic surveys is sufficient to also cover this additional acreage. The August 2021 survey did not confirm the presence of NLEB; however, the acoustic survey did identify the probable presence of the tricolored bat within the original Optimist Solar site (Tetra Tech 2021). No winter NLEB habitat was identified within the Project Site.

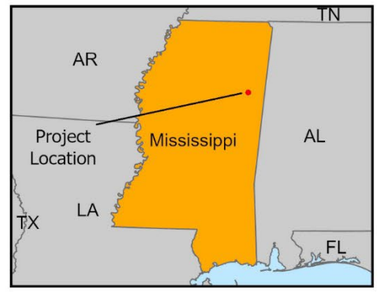


Legend

- Site Boundary
- Additional Survey Area
- Underground Collection Line
- Overhead Collection Line
- Structure

Potential Bat Habitat rating

- High
- Low



N

0 125 250 500 Feet

Figure 4
Potential Bat Habitat
Optimist Solar Facility
Clay County, MS

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 11/2023

Source: Esri, et. al., 2023; Origis, 2023; USFWS, 2022; USGS, 2022

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 16 North

The old fields within the Project Site could potentially provide suitable foraging habitat for the monarch butterfly and the grasshopper sparrow; however, no monarchs or milkweed plants (*Asclepias* spp.), and no grasshopper sparrows were observed on-site. The monarch butterfly is a migratory species that relies on milkweed as a primary food source during its larval (caterpillar) stage and forages on a range of flowering plants in open fields, roadside areas, grasslands, and wetlands as an adult. This species is a candidate for federal listing, which means it is currently not subject to the USFWS Section 7/10 requirements under the ESA (USFWS 2023c); therefore no further consultation would be required.

The old fields could provide suitable habitat for the grasshopper sparrow; however, if present this species would only be temporarily disturbed during the construction phase of the Project. Bewick's wren was once common across the southeast, but its range no longer extends east of the Mississippi River (Audubon 2023). Additionally, no suitable forested habitat with underbrush/thickets was observed within the Project Site; therefore, presence of this species on site is unlikely and no impacts to the species are anticipated.

All of the mussel species in Table 3 are restricted to riffles and shoals of streams with moderate to swift currents and clean water, and two of the species (flat pigtoe and stirrupshell) are believed to be extinct. Neither species has been collected in Mississippi or Alabama since 1980 (NatureServe 2023e and 2023f). The frecklebelly madtom is also associated with rocky riffles and shoals in larger streams and rivers, and is often found in and around aquatic vegetation, which provides cover (MMNS 2014). There are no streams with significant flow, clear water, and sand/gravel/cobble substrates on the Project Site, thus, there is no suitable habitat for any of the mussel species or the frecklebelly madtom, so no impacts to these species are anticipated.

Alabama map turtles are found in large streams and rivers with sand bars, sand banks, and ample basking sites, which may be stumps, fallen trees, or brush piles (NatureServe 2023c). There is no suitable habitat for this species on the Project Site. Alligator snapping turtles are found only in river systems that flow into the Gulf of Mexico (NatureServe 2023d). Adults are typically found in large rivers, canals, lakes, impoundments, and backwater swamps. Juveniles are sometimes found in smaller streams and wetlands. Wetland W-28 could provide marginally suitable habitat for this species; however, the species was not observed during field surveys. Also, there is no direct connection between this wetland and a large stream or impoundment, which makes the species' presence less likely. No impacts are anticipated to the Alabama map turtle or the alligator snapping turtle.

Based on the query from TVA's Regional Natural Heritage Database, 16 rare plants (with state ranks S2 – Imperiled, S3 – Vulnerable, and S4 - Apparently Secure) have been documented within 5 miles of the 92-acre area (TVA 2023). According to TVA records, of the 16 rare plant species, only four are extant to the area: Turk's lily cap (*Lilium superbum*), wild hyacinth (*Camassia scilloides*), prairie parsley (*Polytaenia nuttallii*), and American bladdernut (*Staphylea trifolia*). The remaining species are considered "historic" or "possibly historic." The federally threatened Price's potato bean has been historically documented in Clay County, MS; however, the species is assumed to be extirpated from the area (TVA 2023). Additionally, no suitable habitat for the Price's potato bean was found in the 92-acre area. The site lacked features indicative of potential habitat for the species, including chalk outcrops or limestone areas on ravine slopes that grade into creeks or streams. The forested areas within the survey area were small, dense, and surrounded by agricultural areas, and deemed unsuitable habitat for Price's potato bean. Marginally suitable habitat was present for beardtongue (*Penstemon tenuiflorus*) and ear-flower lobelia (*Lobelia appendiculata*) in the cleared old fields, but no plants were observed. The MNHP Database identified two plant species known to occur within a 2-mile

radius of the Project Site, stemless evening-primrose (*Oenothera triloba*) and rugged-leaf Schlotheimia moss (*Schlotheimia rugifolia*) (MNHP 2023). No suitable habitat was identified in the 92-acre area for any of the other rare plant species, and no impacts to any of the 18 plant species listed in Table 3 are anticipated.

No designated critical habitat for federally listed species was identified within the 92-acre area (USFWS 2023a; MNHP 2023; TVA 2023).

Bald Eagles and Migratory Birds

The bald eagle (*Haliaeetus leucocephalus*) and eight migratory birds "of particular concern" were identified as having the potential to occur in the area: the chimney swift (*Chaetura pelagica*), lesser yellowlegs (*Tringa flavipes*), osprey (*Pandion haliaetus*), painted bunting (*Passerina ciris*), prairie warbler (*Dendroica discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), southeastern American kestrel (*Falco sparverius paulus*), and Swainson's warbler (*Limnothlypis swainsonii*) (Table 4; USFWS 2023a).

In Mississippi, the bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Protection Act (MBTA). The large pond in the 35-acre area south of Yokohama Boulevard could provide marginal foraging habitat for the bald eagle; however, no bald eagles or their nests were observed during the field surveys.

Red-headed woodpeckers were observed nesting in dead trees (snags) within the large PEM/PAB complex within the 35-acre parcel south of Yokohama Boulevard. Red-headed woodpeckers are Birds of Conservation Concern (BCC) within the Southeastern Coastal Plain Bird Conservation Region (USFWS 2021b).

Snags within the large PEM/PAB complex could also provide potentially suitable nesting habitat for the southeastern American kestrel and osprey. The small, forested sections along the railroad south of Yokohama Boulevard, and the forested areas just south of this portion of the Project boundary could provide limited nesting and foraging habitat for the painted bunting and prairie warbler. Additionally, the depressional PEM/PAB wetlands in the 35-acre area south of Yokohama Boulevard could provide potential migration foraging ("stop-over") habitat for the lesser yellowlegs.

No suitable nesting habitat for the chimney swift or Swainson's warbler was observed within the area, as the site was predominantly characterized by old fields and wetlands. The 92-acre area is located in a rural setting, residencies in proximity to the site are too few and scattered to provide appropriate communal nesting for chimney swifts. Additionally, the site lacked the preferred habitat of Swainson's warbler – large contiguous forests with dense understory.

Table 4. Eagles and Migratory Birds with Potential to Occur in or near the Project Site[1]

Common Name	Scientific Name	Preferred Habitat[2]	Suitable Habitat Present?	Species Observed During Field Surveys?
Bald eagle	*Haliaeetus leucocephalus*	Forages and nests around estuaries, large lakes, reservoirs, rivers, and along coastlines. Typically nest in large, super-canopy trees near large waterbodies.	Yes	No
Chimney swift	*Caetura pelagica*	Forages over a variety of habitats including forests, open country, lakes and ponds, suburban areas, and urban areas. Highly associated with urban areas due to accessibility of chimneys for nest sites and communal roosts.	No	No
Lesser yellowlegs	*Tringa flavipes*	Forages along shores of large, shallow, freshwater lakes and sloughs, or portions of salt marshes. Northern Mississippi is included in their migration range.	Yes	No
Osprey	*Pandion haliaetus*	Habitat varies greatly but must include adequate supply of fish within 10-20 km of nest, shallow waters (0.5-2 m deep), and open nest sites. Beavers are a key factor in creating suitable habitat because beaver floodings create dead snags for nesting and shallow ponds for fish.	Yes	No
Painted bunting	*Passerina ciris*	Typically inhabits partly open areas with scattered brush and trees, riparian thickets and brush, and weedy and shrubby areas. Common in scattered strips of woodland between open or overgrown fields.	Yes	No
Prairie warbler	*Dendroica discolor*	Typically inhabits southern pine forests, pine and scrub oak barrens, abandoned fields/pastures with shrubby growth, regenerating forests, and grassland-forests- prairie edge habitat. Breeds in various shrubby habitats lacking closed canopies.	Yes	No
Red-headed woodpecker	*Melanerpes erythrocephalus*	Found in a variety of open forested habitats, such as deciduous woodlands, lowland and upland habitat, river bottoms, open woods, open agricultural land, and along roadsides and forest edges. Favor areas with dead tree limbs or snags for nesting.	Yes	Yes

Common Name	Scientific Name	Preferred Habitat[2]	Suitable Habitat Present?	Species Observed During Field Surveys?
Southeastern American kestrel	*Falco sparverius paulus*	Occur in a wide variety of open to semi-open habitats, including meadows, grasslands, deserts, early old field successional habitats, open parkland, agricultural fields, and both urban and suburban areas. They require suitable nest trees (isolated large, dead trees) and perches.	Yes	No
Swainson's Warbler	*Limnothlypis swainsonii*	Occur in bottomland hardwood forests, mixed-mesophytic montane forests, and early-seral pine stands. Prefers areas with shaded and dense understory, abundant leaflitter, and little herbaceous ground cover. Generally found in large, un-fragmented blocks of forest.	No	No

[1]Sources: USFWS IPaC; MNHP 2023; TVA 2023.
[2]Sources: Anich 2020; Bierregaard et al. 2020; Buehler 2022; Frei et al. 2020; Lowther et al. 202; Nolan et al. 2020; Smallwood and Bird 2020; Steeves et al. 2020; Tibbits and Moskoff 2020.

3.2.2.2 Environmental Consequences

3.2.2.2.1 Alternative A – No Action

Under the No Action Alternative, MS Solar 7 would construct one of the previously proposed gen-tie routes; therefore, Project-related impacts to biological resources would be those described in the 2022 Final EA. The new 92-acre area would not be affected; there would be no change in its plant and animal communities, including sensitive species.

3.2.2.2.2 Alternative B – Proposed Action

Vegetation

The Proposed Action would result in the clearing of some existing vegetation in the old fields, limited to the proposed gen-tie ROW corridor (approximately 3,656 feet in length and 50 feet wide) and temporary construction access roads and laydown areas. Upon completion of construction, the disturbed area would be re-vegetated with native grasses and forbs, in accordance with Executive Order (EO) 13112 (Invasive Species), as defined by TVA (2022c). Low-growing species would be planted to reduce the amount of maintenance required. Additionally, vegetation within the ROW corridor will be maintained via mowing throughout the life of the Project, avoiding the small portion of wetland W-11, where the gen-tie intersects.

Wildlife

Under the Proposed Action, there would be minimal clearing of the old fields (approximately 3,656 feet in length and 50 feet wide) for the proposed gen-tie ROW corridor. As discussed in Section 3.4.2.2 of the 2022 Final EA, construction activities associated with the installation of the gen-tie line could temporarily displace a variety of wildlife species that use the old fields. Additionally, approximately 0.112-acre of trees along the railroad ROW would be cleared for construction of the gen-tie line; because this is such a small amount of tree removal, minimal impacts to common species using this forested area are anticipated. Some smaller, less-mobile animals (e.g. common small mammals and reptiles) could be harmed by heavy equipment. Larger, more mobile species (most large mammals and birds) would be expected to disperse to nearby areas with suitable habitat when construction activities begin.

The desktop review and initial reconnaissance determined that 35 protected and sensitive species could occur in the Project vicinity, plus two mussel species (stirrupshell and flat pigtoe) presumed to be extinct. Following the field surveys, the Project Site was determined to contain potential suitable habitat for thirteen of the 35 species. These species were the NLEB, Rafinesque's big-eared bat, tricolored bat, bald eagle, grasshopper sparrow, lesser yellowlegs, osprey, painted bunting, prairie warbler, red-headed woodpecker, southeastern American kestrel, beardtongue, and ear-flower lobelia. Impacts to rare, threatened, and endangered species, and protected migratory birds are discussed in the two sections that follow.

Rare, Threatened, and Endangered Species

The gen-tie will be predominantly constructed in upland areas (the old fields), largely avoiding sensitive wetland habitats. An insignificant amount of forested habitat (approximately 0.112-acre) will be cleared for construction of the gen-tie. Thus, minimal impacts are expected as the Project would have little impact on the existing habitat in the area, and any impacts would be temporary, occurring during the construction phase.

As previously described in Section 3.2.2.1, approximately 3.9 acres of potential bat roosting habitat exist within the 92-acre Project Site. Due to the presence of suitable bat foraging habitat

(wetlands and forested area along the railroad ROW) and proximity of the 92-acre Project Site to the original Optimist Solar Site, the tricolored bat is assumed to be present within the 92-acre Project Site. Similar to the NLEB, conservation measures for the tricolored bat, once listed, may include time of year restrictions on tree removal and restrictions on working in/around hibernacula zones. Listing of the tricolored bat before or during the tree removal phase of Project construction would require consultation with USFWS.

Bald Eagles and Migratory Birds

As noted previously, bald eagles have not been observed in the 92-acre area and are not expected to be affected by Project activities. Activities associated with the Proposed Action are consistent with the National Bald Eagle Management guidelines (USFWS 2007). Bald eagles and migratory birds resting or foraging in the area could be disturbed by construction activity and the installation and operation of the large backup generator, but would be expected to simply move to a neighboring property that offers suitable habitat in response to the disturbance. There would be minor energetic expenses associated with dispersing to another area, but any impacts would be minor. Further, the potentially suitable nesting and foraging habitat for these species is associated with forested areas along the railroad ROW and wetlands. Project construction would largely avoid impacts to wetland areas, and only a small amount of potential nesting habitat (0.112-acre of tree clearing along the railroad ROW) is expected to be affected by Project activities. MS Solar 7 will adhere to the provisions of the MBTA during construction and operation of the Project.

3.2.3 Air Quality

This section describes the potential impacts on air quality that would be associated with the No Action and Proposed Action Alternatives.

3.2.3.1 Affected Environment

Ambient air quality is determined by the type and concentration of pollutants emitted into the atmosphere, the size and topography of the airshed in question, and the prevailing meteorological conditions in that airshed. As previously noted, the Project Site is located in Clay County, a rural area of northeastern Mississippi where the land use is mostly agricultural. Nearby urban areas include West Point and Columbus. Pollutants emitted in the area would be reflective of an agricultural setting, traffic between the urban areas, and a nearby industrial site.

The 1970 Federal Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) designed to protect public health (40 CFR part 50). Six air pollutants (criteria pollutants) have been identified by the Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), sulfur oxides (SO_X), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and lead (Pb). Although SO_X is listed as the criteria pollutant, ambient concentrations are actually measured as sulfur dioxide (SO_2). NAAQS are currently established for two PM size fractions: PM less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$).

3.2.3.2 Environmental Consequences

3.2.3.2.1 Alternative A – No Action

Under the No Action Alternative, MS Solar 7 would construct a gen-tie line along one of the previously proposed gen-tie routes; therefore, Project-related impacts to air quality would be those described in the 2022 Final EA. The 92-acre area under consideration in this SEA would be unimpacted and exist under current conditions.

3.2.3.2.2 Alternative B – Proposed Action

This section describes impacts on the affected environment from the installation and operation of an emergency generator.

MS Solar 7 plans to utilize a Baudouin emergency diesel generator engine with a standby rated capacity of 2,700 kilowatts (kW) and 3,621 horsepower (hp) to provide on-site emergency power capabilities in the event of power failure. To assess the applicability of air permitting for this engine, the following were assumed:

- The emergency generator engine would be certified to meet Tier II emission standards.
- The emergency generator engine would be fired with ultra-low sulfur diesel (ULSD) fuel and will be operated for operational readiness testing, routine maintenance, and in the event of an emergency.
- Operation of the emergency generator engine would be limited to a maximum of 500 hours of operation per rolling 12-month period for all operating conditions.
- Operation for operational readiness testing and routine maintenance is limited to 100 hours of operation per rolling 12-month period for all operating conditions.

The proposed generator engine would be subject to the requirements of 40 CFR Part 60 Subpart IIII. Compliance with this regulation is demonstrated by installing an engine certified by the manufacturer to meet the emission standards outlined in this subpart. This engine will also be subject to 40 CFR Part 63 Subpart ZZZZ. Compliance with the Part 63 requirements is presumed when the engine manufacturer certifies compliance to 40 CFR Part 60 Subpart IIII.

Evaluation of MDEQ air permitting applicability requires emissions to be calculated. The potential-to-emit emissions were estimated based on the above assumptions. The Tier II emission standards for stationary combustion ignition engines were used to calculate emissions of CO, NO_X, PM_{10}, and volatile organic compounds (VOCs). AP-42 Section 3.4 was used to calculate emissions of SO_2, Pb, and HAP (hazardous air pollutants) (USEPA 1995b). The total estimated emissions are summarized below in Table 5.

Table 5. PTE Emissions Summary, Annual Totals

	CO	NO_X	PM_{10}	SO_2	VOC	Pb	Single Largest HAP	Total HAPs
Annual Emissions (tons per year)	5.21	9.05	0.30	0.01	0.51	0	4.68E-03	8.99E-03

Sources include: USEPA 1995a, 1995b, 2023.

Based on the estimated emissions and Mississippi State Regulation 11 Miss. Admin. Code Pt. 2, R. 2.13 Exclusions, this emergency generator engine would be exempt from obtaining a construction or operating permit because the potential uncontrolled emissions of PM_{10}, NO_X, CO, VOC, or SO_2 are each less than 10 tons per year (tpy), each individual HAP is less than 1 tpy, and total HAPs are less than 2.5 tpy. However, MS Solar 7 would still be required to submit a true minor determination permit application to the MDEQ. The agency would be expected to process the application as a true minor source and issue a written concurrence that a construction or operating permit is not necessary.

Because the emergency diesel generator would be used infrequently, for power outages and periodic testing, its emissions would not have a significant impact on air quality. Any impacts from use of the emergency generator would be small and localized.

3.2.4 Cultural Resources

This section describes an overview of existing cultural resources in the Project Site vicinity and the potential impacts on these cultural resources that would be associated with the No Action and Proposed Action Alternatives. Components of cultural resources that are analyzed include archaeological and architectural resources.

3.2.4.1 Affected Environment

Federal agencies are required by the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) to consider the possible effects of their undertakings on historic properties (i.e., cultural resources that are listed in the National Register of Historic Places (NRHP) or that meet the criteria to be eligible to the NRHP). The term “undertaking” means any project, activity, or program that is funded under the direct or indirect jurisdiction of a federal agency, or requires a federal license, permit, or federal approval.

An agency may fulfill its statutory obligations under NHPA by following the process outlined in the implementing regulations, Section 106 of NHPA, at 36 CFR Part 800. Under these regulations, considering an undertaking’s possible effects on historic properties is accomplished through a four-step review process:

1) Initiation (defining the undertaking and the area of potential effects [APE], and identifying the consulting parties);
2) Identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties);
3) Assessment of adverse effects (determining whether the undertaking would damage the qualities that make the property eligible for the NRHP; and
4) Resolution of adverse effects (by avoidance, minimization, or mitigation).

Throughout the process, the agency must consult with the appropriate State Historic Preservation Officer (SHPO) and federally recognized Indian tribes that have an interest in the undertaking and should provide public notice of the undertaking.

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, and locations of important historic events that lack material evidence of those events. Cultural resources that are included or considered eligible for inclusion in the NRHP and maintained by the Secretary of the Interior are called historic properties. To be included or considered eligible for inclusion in the NRHP, a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, it must also meet one of four criteria: (a) association with important historical events; (b) association with the lives of significant historic persons; (c) having distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or having high artistic value; or (d) having yielded or having the potential to yield information important in history or prehistory.

When a TVA action would adversely affect a historic property, TVA must, in consultation with SHPOs, tribes, and others throughout the Section 106 process, consider ways to avoid or

minimize the adverse effect. If avoidance or minimization are not feasible, measures to mitigate the adverse effect must be taken.

As part of the evaluation process, New South Associates (NSA) performed background research and archaeological and historic architectural field surveys (NSA 2022a, 2022b). The Project Site vicinity contains archaeological resources dating from the Early Archaic period through the Historic period, a span of some 10,000 years. There is potential for resources within the archaeology APE representing any of these time periods.

Background Research Results

The background research included a review of recorded cultural resource files maintained by the Mississippi Department of Archives and History (MDAH) plus a literature review of topics pertinent to the Project Site, including soils, environmental setting, prehistoric settlement patterns, and historic period development. The file review identified one recorded archaeological site and no recorded historic architectural resources within the respective archaeological and architectural APEs. The previously recorded archaeological site, the Illinois Central Railroad (22CL0103), had been recommended previously as NRHP-eligible under Criterion A for Transportation.

Identification Survey and Field Findings

NSA conducted an addendum Phase I cultural resources field survey of an additional 92 acres within the Project APEs during three field visits between March and June 2023 to determine the presence of archaeological and historic architectural resources that are eligible for listing on the NRHP (NSA 2023). The supplemental Phase I archaeological survey identified two newly recorded historic period archaeological sites, both recommended Not Eligible for listing on the NRHP. One previously recorded site (22CL0103) was revisited and re-surveyed. No cultural material was recovered from the Illinois Central Railroad site and NSA recommended no change to its eligibility status.

The APE for the historic architectural survey was extended to the north to encompass all areas within one-half mile of the addendum survey area for viewshed analysis. This section of the Project viewshed was contained within the original historic architectural survey, and thus, no further historic architectural survey was required as part of this addendum.

3.2.4.2 Environmental Consequences

This section describes the potential impacts to cultural resources should the Proposed Action or No Action Alternatives be implemented.

3.2.4.2.1 Alternative A – No Action

Under the No Action Alternative, MS Solar 7 would construct a gen-tie line along one of the previously proposed routes; therefore, Project-related impacts to cultural resources would be those described in the 2022 Final EA. The 92-acre area under consideration in this SEA would be unimpacted and exist under current conditions. The No Action Alternative will produce no Project-related impacts to recorded cultural resources in the archaeological APE.

3.2.4.2.2 Alternative B – Proposed Action

Based on the cultural resources survey conducted by NSA, TVA determined that that no historic properties would be affected by the proposed project. TVA consulted with MDAH and federal recognized Indian tribes regarding TVA's findings.

In regard to the potential for a rural historic landscape, TVA had previously concluded that although the area remains primarily in agricultural use, changes to major landscape features in the region including land use, patterns of spatial organization, historic boundary demarcations, and buildings, structures, and objects have diminished the integrity of the overall landscape. The results of the Addendum survey have not altered NSA's assessment nor TVA's conclusion that the local rural landscape does not qualify for NRHP eligibility under any of the applicable criteria.

MDAH received the *Addendum Report: Phase I Cultural Resource Survey of 92 Acres Optimist Solar Farm, Clay County, Mississippi* from TVA on September 12, 2023 (Appendix B). The Chickasaw Nation agreed that sites 22CL1110 and 22CL1111 are ineligible for listing on the National Register of Historic Places. SHPO did not respond within the 30-day timeframe and pursuant to CFR 800.4d(1)(i), TVA's Section 106 responsibilities are fulfilled.

3.2.5 Cumulative Impacts

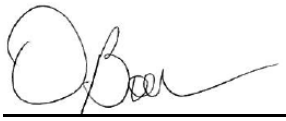
There are no additional cumulative impacts to those identified in TVA's 2022 Final EA. However, it should be noted that with the proposed relocation of the gen-tie line in this supplemental EA, overall impacts would be reduced relative to the 2022 Final EA.

3.2.6 Mitigation Measures

In addition to the requirements of any necessary permits, TVA would continue to implement the mitigation measures identified in its 2022 Final EA to ensure that adverse impacts on the environment are avoided, minimized, or mitigated. All applicable permits would be acquired; therefore, associated permit-related mitigation measures and best management practices would be implemented to further minimize impacts.

3.2.7 Conclusion and Findings

Based on the findings listed above and the analyses in the EA, we conclude that the Proposed Action – constructing, operating, and maintaining the Optimist Solar and BESS facility, gen-tie line upgrade, and addition of a backup diesel generator – would not be a major federal action significantly affecting the environment. This finding of no significant impacts is contingent upon adherence to the mitigation measures described above. Accordingly, an environmental impact statement is not required.



December 12, 2023

Dawn Booker
Manager, NEPA Program
Environment & Sustainability

Date Signed

Chapter 4 – List of Preparers

4.1 TVA Preparers

Table 6 presents the members of the Project team and summarizes the expertise of each member and their contributions to this EA.

Table 6 Optimist Solar Environmental Assessment Team

Name/Education	Experience	Project Role
TVA		
Elizabeth Burton Hamrick MS, Wildlife and Fisheries Science, BA, Biology, BA, Anthropology	23 years in biological field studies, 10 years in biological compliance, NEPA compliance, and ESA consultation for T&E terrestrial animals	Terrestrial zoology, threatened and endangered species
Michaelyn Harle	22 years in archaeology and cultural resources management	Supervisor/Archaeologist
Brittany Kunkle	4 years of professional experience in NEPA and environmental compliance	NEPA Compliance
Emily Kathryn McCann MS, Environmental Biology, BS, Biology	7 years' experience in field biology, environmental reviews, NEPA, and ESA compliance, and consulting with Federal agencies	Biological Compliance
Ashley Pilakowski	11 years in environmental planning, policy, and project management	Project Manager, Solar Coordination & Integration
Tetra Tech		
Taylor Andrzejak MS, Marine and Environmental Biology, BS, Fisheries and Wildlife	Experience conducting ecological surveys in the Southeast and recent experience with solar facility projects in the Southeast.	Document Preparation
Megan Buckalew MS, Environmental Science, BS, Biology	Nearly 15 years as a biologist, natural resource studies, environmental permitting, NEPA documentation	Document Preparation
Chandler Dangle MS, Forestry BS, Forest Resources	5 years of environmental assessment, NEPA documentation, hydrology, soils, wetlands, and permitting	Deputy Project Manager, Coordination, Document Preparation

Name/Education	Experience	Project Role
Robert Jacoby, RAP MA, Historic Preservation BA, Anthropology	More than 30 years of experience in historic preservation, archeological research projects and cultural resources sensitivity assessments	Document Preparation
Giles Kingsley BA, Geography/ Anthropology	7 years in GIS analysis	Mapping and Analysis
Lisa Matis MS, Mechanical Engineering, BS, Chemical Engineering	More than 30 years in NEPA documentation, regulatory compliance, and permitting	Project Manager, Senior Technical Reviewer
Hal Mitchell BS, Wildlife Biology	More than 15 years of experience conducting habitat evaluations, wildlife surveys, and studies of special-status species	Field surveys, Technical Reviewer
Philip Moore MS, Wildlife and Fisheries Biology, Post Graduate Study, Zoology, BA, English	More than 30 years in NEPA documentation, project management, technical writing, protected species evaluations and surveys, and field assessments	Senior Technical Reviewer
Danielle Sank BS, Biology/Evolutionary Sciences	More than 12 years of experience in NEPA documentation, project management, technical writing, protected species evaluations and surveys, and field assessments	Technical Reviewer
Dan Spaulding BS, Botany MS, Biology	Extensive experience as a senior botanist with surveying rare and protected plant species across the Southeast.	Field surveys, Technical Reviewer

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Attachment A – Memo: MS Solar 7 – Biological Surveys on Additional Parcels along Yokohama Blvd

TETRA TECH

Memo

To:	Nathan Rogers (Origis Energy)
Cc:	Edwin Moses (Origis Energy)
From:	Chandler Dangle, Brian Cole, Lisa Matis (Tetra Tech)
Date:	November 8, 2023
Subject:	MS Solar 7 – Biological Surveys on Additional Parcels along Yokohama Blvd

INTRODUCTION

MS Solar 7, LLC (Origis) proposes to construct a utility-scale solar farm and associated infrastructure in Clay County, Mississippi. Tetra Tech, Inc. (Tetra Tech) and their subcontractors (CCR Environmental, New South Associates) performed wetland delineations, protected species habitat surveys (including bat habitat assessments and acoustic surveys), ecological assessments, and cultural resource surveys for the Project Site between November 2020 and March 2021, in accordance with applicable regulations and Tennessee Valley Authority (TVA) guidelines.

In February 2023, Origis requested that Tetra Tech assess an additional 35-acre piece of land south of Yokohama Boulevard (Clay County Parcel Maps 2023). Land cover in the area includes herbaceous, shrub/scrub, forested, and wetland areas. The eastern portion of the parcel includes a pond (borrow pit) that appears to have been used as a source of fill or gravel during construction of the adjacent highway overpass. The parcel was burned after the 2022 growing season and about a third of the parcel was vegetatively bare in early spring 2023. Evidence of North American beaver (*Castor canadensis*) activity was observed throughout the eastern portion of the parcel. This included an impoundment created by damming, numerous small trees that were chewed down, and an area of standing dead timber that was caused by inundation.

In May of 2023, Origis requested that Tetra Tech assess an additional 57-acre area north of the original Project boundary. This triangularly shaped parcel is bounded by Yokohama Boulevard, Old Aberdeen Road, and a 500 kV transmission line right-of-way. Land use in the area was likely agricultural at one time but has transitioned into an old field dominated by upland, herbaceous plants with a few scattered sapling trees. More mature trees occur along the railroad right-of-way. This area also exhibited signs of prescribed burning. A culvert, which directs water under Yokohama Boulevard to the pond south of the road, was observed. The two new parcels will be referred to in this memo as the Project Site.

WETLANDS AND WATERBODIES

Tetra Tech surveyed the parcels for wetlands and surface waters in March, May, and June of 2023. One open water (OW-27), two emergent wetlands (W-11, an extension of the original delineation, and W-29), and one aquatic bed wetland (W-28) were identified within the areas (Table 1; Figure 1). The three wetlands totaled 23.56 acres, and the open water feature was determined to be 6.12 acres. Field observed data were transcribed onto the required U.S. Army Corps of Engineers (USACE) Wetland Determination Data Sheets (Appendix A), in accordance with the USACE Wetland Delineation Manual (1987) and the Regional Supplement

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to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain (2010). No unique habitats were observed during the 2023 surveys. Photographs of site conditions and new features can be seen in Appendix B (Figure 2 displays photo locations). The TVA Rapid Assessment Method (TVARAM) wetland function forms can be found in Appendix C. The USACE Antecedent Precipitation Tool Results can be seen in Appendix D.

Table 1. Delineated Features within the Project Site

Feature ID	Field-Verified Cowardin Classification	Acres	Potentially Jurisdictional?[1]
OW-27	PUBxH	6.12	No
W-11	PEM	18.21	No
W-28	PAB	5.24	No
W-29	PEM	0.11	No
TOTAL		29.68	

1 Potential jurisdictional status determined in accordance with the Revised Definition of "Waters of the United States", as described in 86 FR 69372.

It is Tetra Tech's opinion that the three wetlands and one open body of water are likely to be considered non-jurisdictional features based on the definition of WOTUS following the *Sackett* ruling (USEPA 2023a, 2023b). Although these findings were based upon a survey using USACE-approved protocols, an official determination on the presence or absence of jurisdictional WOTUS within the 92-acre Project Site must be made by the USACE through the Jurisdictional Determination process. A re-evaluation of the assumed jurisdiction of the delineated features may be warranted following the official publication of the WOTUS rule amendment.

PROTECTED SPECIES HABITAT ASSESSMENT

Tetra Tech biologists surveyed the areas for protected species habitat in March, May, and June of 2023. Before conducting the field assessment, Tetra Tech queried the following public databases to determine the potential for federally listed, state-listed, and other special-status species to occur in the 92-acre Project Site. (Table 2):

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Official Resource List (Appendix E; USFWS 2023a);
- The Tennessee Valley Authority (TVA) Regional Natural Heritage Database (Appendix F; TVA 2023); and
- The Mississippi Natural Heritage Program (MNHP) Heritage Spatial Data Request (Appendix G; MNHP 2023).

The IPaC query generated a list of four federally designated species that may occur within the boundary of the proposed Project or may be affected by the proposed Project: northern long-eared bat (NLEB; *Myotis septentrionalis*), alligator snapping turtle (*Macrochelys temminckii*), monarch butterfly (*Danaus plexippus*), and Price's potato bean (*Apios priceana*). Additionally, five avian species protected under the Migratory Bird Treaty Act (MBTA) that have been designated Birds of Conservation Concern (BCC) were identified: chimney swift (*Chaetura pelagica*), lesser yellowlegs (*Tringa flavipes*), prairie warbler (*Setophaga discolor*), red-headed

woodpecker (*Melanerpes erythrocephalus*), and southeastern American kestrel (*Falco sparverius paulus*). The IPaC identified no critical habitats within the Project Site.

Communication with the USFWS Mississippi Ecological Services Office revealed that the proposed endangered tricolored bat (*Perimyotis subflavus*) may also occur across the state (Personal communication; Elizabeth Hamrick, TVA). The USFWS issued a proposal to list the tricolored bat as an endangered species on September 22, 2022 (87 FR 56381) and solicited public comments, with the comment period closing on November 14, 2022. The agency received more than 200 comments from parties who raised a variety of issues, including the need for regional guidance on thresholds (minimal acreage of disturbance) for actions that may adversely affect the species (McCormick and Wortzel 2023). The status of this proposal is unknown, but the proposed rule makes clear (at 87 FR 56382) that "Based on (comments and information received), we may conclude that the species is threatened instead of endangered, or we may conclude that the species does not warrant listing as either an endangered or threatened species." In addition to the currently listed species on the IPaC, the tricolored bat is included in the memo as the species is likely to be listed prior to ground disturbance activities taking place for the Project.

The TVA database query returned a total of six federally listed species with potential to occur in the 92-acre Project Site that included a plant, the previously mentioned, federally threatened Price's potato bean; a federally threatened fish, the frecklebelly madtom (*Noturus munitus*); and five federally endangered mussels: southern clubshell (*Pleurobema decisum)*, ovate clubshell (*Pleurobema perovatum*), southern combshell (*Epioblasma penita*), flat pigtoe (*Pleurobema marshalli*), and stirrupshell (*Quadrula stapes*). The frecklebelly madtom is only federally protected where it occurs in the Upper Coosa River in Georgia and Tennessee, so the species is not federally protected in Mississippi (USFWS 2023b). It is, however, a state-endangered species in Mississippi. The bald eagle (*Haliaeetus leucocephalus*), protected under the Bald and Golden Eagle Protection Act, was also identified as potentially occurring within the 92-acre Project Site.

On August 7, 2023, Tetra Tech submitted a request to the MNHP for records of documented species occurrences within a 2-mile radius of the of the 92-acre Project Site. Two more special-status species were identified as potentially occurring in the area of interest, the partial status grasshopper sparrow (*Ammodramus savannarum*) and the state-endangered Bewick's wren (*Thryomanes bewickii*). The grasshopper sparrow has "partial status" under the Endangered Species Act (MNHP 2023) because the Florida grasshopper sparrow subspecies (*Ammodramus savannarum floridanus*) is federally endangered (51 FR 27492).

Table 2. Species of concern with potential to occur in or near the Project Site[1].

Common name	Scientific name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Mammals						
Northern long-eared bat	*Myotis septentrionalis*	E	--(S1N)	Winter hibernacula include caves or mines. During summer, spring, and fall, they will roost underneath bark in crevices of live or dead trees. Dense forest areas and forages in a variety of habitats; closely associated with cave structures.	Yes	No
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	--	--(S3)	Winter hibernacula include caves, rock outcrops, hollow trees, and buildings. Summer roosts include hollow trees, buildings, bridges, or culverts, in or near wooded areas.	Yes	No
Tricolored bat	*Perimyotis subflavus*	PE	--(S3/S4)	Found along forest edges, riparian areas, and open water. Roosts in caves, mines, buildings, bridges/culverts, tree cavities, and tree foliage. Hibernates in caves, mines, box culverts and rock crevices.	Yes	No
Birds						
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	--(S2B,S2N)	Forages and nests in estuaries, large lakes, reservoirs, rivers, and along coastlines. Typically nest in large, super-canopy trees within proximity to large waterbodies.	Yes	No
Bewick's wren	*Thryomanes bewickii*	--	E(S1B,S1N)	Typically inhabits thickets, underbrush, gardens. Or in brushy areas around the edges of woods.	No	No
Chimney swift	*Caetura pelagica*	BCC	--	Forages over a variety of habitats including forests, open country, lakes and ponds, suburban areas, and urban areas. Highly associated with urban areas due to accessibility of chimneys for nest sites and communal roosts.	No	No
Grasshopper sparrow	*Ammodramus savannarum*	PS	--(S3B,S3N)	Found in grassland, hayfields, prairies, especially overgrown pastures, and hayfields. During migration prefers open fields.	Yes	No

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Common name	Scientific name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Lesser yellowlegs	*Tringa flavipes*	BCC	--	Forage along shores of large, shallow, freshwater lakes and sloughs, or portions of salt marshes. Northern Mississippi is included in their migration range.	Yes	No
Osprey	*Pandion haliaetus*	--	-- (S3B,S1S2N)	Habitat varies greatly but must include adequate supply of fish within 10-20 km of nest, shallow waters (0.5-2 m deep), and open nest sites. Beavers are a key factor in creating suitable habitat because beaver floodings create dead snags for nesting and shallow ponds for fish.	Yes	No
Prairie warbler	*Dendroica discolor*	BCC	--	Typically inhabits southern pine forests, pine and scrub oak barrens, abandoned fields/pastures with shrubby growth, regenerating forests, and grassland-forests- prairie edge habitat. Breeds in various shrubby habitats lacking closed canopies.	Yes	No
Red-headed woodpecker	*Melanerpes erythrocephalus*	BCC	--	Found in a variety of open forested habitats, such as deciduous woodlands, lowland and upland habitat, river bottoms, open woods, open agricultural land, and along roadsides and forest edge. Favor areas with dead tree limbs or snags for nesting.	Yes	Yes
Southeastern American kestrel	*Falco sparverius paulus*	BCC	--(S3B)	Occur in a wide variety of open to semi-open habitats, including meadows, grasslands, deserts, early old field successional habitats, open parkland, agricultural fields, and both urban and suburban areas. They require suitable nest trees (isolated large, dead trees) and perches.	Yes	No
Reptiles						
Alabama map turtle	*Graptemys pulchra*	PSAT	--(S2?)	Occur in medium-sized rivers to large creeks with sand bars and sturdy banks, basking sites (such as logs), and deep pools. Nests are dug in sand bars and sandy banks.	No	No

Common name	Scientific name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Alligator snapping turtle	*Macrochelys temminckii*	PT	--(S3)	Associated with structures (tree root masses, stumps, submerged sub-surface trees) that are found in large rivers, major tributaries, bayous, canals, swamps, lakes/ponds, oxbows, and beaver ponds. Nests in dry areas approximately 50 to 100 feet from occupied waterbodies typically between April and June.	Yes	No
Fish						
Frecklebelly madtom	*Noturus munitus*	PS:T	E(S2)	Preferred habitat is rocky riffles, rapids, and runs in small to large, vegetated rivers.	No	No
Mussels						
Flat pigtoe	*Pleurobema marshalli*	E	E(SX)	Occupies riffles and shoals in sandy gravel to gravel- cobble substrates with moderate to fast currents in medium to large rivers. This species once occurred in the Tombigbee River in Mississippi and Alabama but may now be extinct.	No	No
Ovate clubshell	*Pleurobema perovatum*	E	E(S1)	Occupies sand/gravel shoals and runs of small rivers and large streams. Known to occur in the Buttachatchee River and Yellow Creek in Mississippi and Alabama.	No	No
Southern clubshell	*Pleurobema decisum*	E	E(S1)	Endemic to the Mobile River Basin in Alabama, Georgia, Mississippi, and Tennessee. Occurs in large creeks/streams and rivers within gravel and sand substrates.	No	No
Southern combshell	*Epioblasma penita*	E	E(S1)	Found in riffles or shoals of medium sized rivers with sandy gravel to gravel-cobble substrates in moderate to swift current. Is now only known to occur in parts of the Buttachatchee River in Mississippi and Alabama	No	No
Stirrupshell	*Theliderma stapes*	E	E(SX)	Found in riffles and shoals on sandy gravel to gravel- cobble substrates. Requires clean flowing water. Once occurred in the Tombigbee River in	No	No

Common name	Scientific name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
				Mississippi and Alabama, now presumed to be extinct.		
Insects						
Monarch butterfly	*Danaus plexippus*	FC	--	Occupies fields, prairies, meadows, grasslands, and woodland edges. Typically prefers milkweed (*Asclepias* spp.) dominant fields or pastures for foraging and reproducing. The species' migration route crosses through Mississippi.	No	No
Plants						
Allegheny-spurge	*Pachysandra procumbens*	--	--(S3)	Found in rich woods with limestone substrate.	No	No
American bladdernut	*Staphylea trifolia*	--	--(S3)	Nutrient-rich bottomlands, woodland thickets, and moist soils along waterways	No	No
American ginseng	*Panax quinquefolius*	--	--(S3)	Plants occur in rich, cool, moist hardwood forests, under a closed canopy. They especially occur on slopes or ravines.	No	No
Beard-tongue	*Penstemon tenuiflorus*	--	--(S3)	Dry, open woods, cedar-glades, and calcareous barrens. Thin or sandy soil, usually calcareous.	Yes	No
Bur oak	*Quercus macrocarpa*	--	--(S2)	Typically found on limestone or calcareous clay habitats including bottomlands, riparian slopes, prairies, and poorly drained areas	No	No
Canada moonseed	*Menisperum canadense*	--	--(S3)	Cliffs, balds or ledges, forests.	No	No
Canada wild ginger	*Asarum canadense* var. *reflexum*	--	--(S3)	Typically found in upland rich woods with high pH soils and are associated with calcareous rock outcrops or rich soils	No	No
Ear-flower lobelia	*Lobelia appendiculata*	--	--(S3)	Roadsides, fields, prairies, and grassy openings in woods.	Yes	No
Lobed tickseed	*Coreopsis auriculata*	--	--(S2/S3)	Wooded slopes near creeks or rivers, sandy hills.	No	No

Common name	Scientific name	Status[2]		Preferred Habitat[3]	Suitable Habitat present?	Species Observed During Field Surveys?
		Federal	State			
Mountain holly	*Ilex montana*	--	--	Mesic forests at higher elevation with average, moist, well-drained acidic soils.	No	No
Nettle-leaf sage	*Salvia urtucufolia*	--	--(S2)	Dry, open woods and forest edges.	No	No
Prairie parsley	*Polytaenia nuttallii*	--	--(S2)	Upland prairies, hill prairies, limestone glades, chert glades, thinly wooded bluffs, and savannas.	No	No
Price's potato bean	*Apios priceana*	T	--(S1)	Habitat includes woodland edges in limestone areas, river bottoms, and roadside or powerline ROWs. Typically occurs in association with chinkapin oak (*Quercus muehlenbergii*), white ash (*Fraxinus americana*), basswood (*Tilia americana*), sugar maple (*Acer saccharum*), slippery elm (*Ulmus rubra*), redbud (*Cercis canadensis*), spicebush (*Lindera benzoin*), and switchcane (*Arundinaria tecta*).	No	No
Smoother sweet-cicely	*Osmorhiza longistylis*	--	--(S3)	Woodland areas with deep, moist, fertile soils.	No	No
Turk's cap lily	*Lilium superbum*	--	--(S3/S4)	Moist meadows, woods, and coves.	No	No
Wild hyacinth	*Camassia scilloides*	--	--(S2)	Occurs in prairies, moist forests, slopes, savannahs, glades, and woodlands at elevations of 100 to 1,000 meters	No	No

[1]Sources include: USFWS IPaC; Mississippi Natural Heritage Program and spatial data request from MNHP staff; Mississippi Museum of Natural Science Endangered Species of Mississippi; Tennessee Valley Authority Regional Natural Heritage Database

[2]Status: E = Endangered; T = Threatened; BCC = Bird of Conservation Concern; BGEPA = Bald and Golden Eagle Protection Act; PS = Partial Status; PS:T = Partial Status, Threatened; PSAT = Proposed Similarity of Appearance, Threatened; PE= Proposed Endangered; PT = Proposed Threatened; FC = Federal Candidate; S# = State Rank (presumed extirpated (X), critically imperiled (1), imperiled (2), vulnerable (3), apparently secure (4), secure (5), B = breeding population, N = non-breeding).

[3]Sources include: Bierregaard et al. 2020; Buehler 2022; Frei et al. 2020; Illinois Wildflowers 2018; MMNS 2014; Missouri Botanical Garden 2023; National Audubon Society 2023a, 2023b; Native Plant Trust 2023; NatureServe: 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g, 2023h, 2023i, 2023j, 2023k, 2023l, 2023m, 2023n, 2023o, 2023p, 2023q; Nolan et al. 2020; NC State Extension Gardener 2023a and 2023b; Smallwood and Bird 2020; Spaulding and Barger 2016; Steeves et al. 2020; Tibbitts and Moskoff 2020; USFWS 2023b, 2023c; US Wildflower 2023

All of the mussel species in Table 2 are restricted to riffles and shoals of streams with moderate to swift currents and clean water, and two of the species (flat pigtoe and stirrupshell) are believed to be extinct. Neither species has been collected in Mississippi or Alabama since 1980 (NatureServe 2023e and 2023f).

The frecklebelly madtom is also associated with rocky riffles and shoals in larger streams and rivers, and is often found in and around aquatic vegetation, which provides cover (MMNS 2014). There are no streams with significant flow, clear water, and sand/gravel/cobble substrates on the Project Site, thus, there is no suitable habitat for any of the mussel species or the frecklebelly madtom.

Alabama map turtles are found in large streams and rivers with sand bars, sand banks, and ample basking sites, which may be stumps, fallen trees, or brush piles (NatureServe 2023c). There is no suitable habitat for this species on the Project Site. Alligator snapping turtles are found only in river systems that flow into the Gulf of Mexico (NatureServe 2023d). Adults are typically found in large rivers, canals, lakes, impoundments, and backwater swamps. Juveniles are sometimes found in smaller streams and wetlands. Wetland W-28 could provide marginally suitable habitat for this species; however, the species was not observed during field surveys. Also, there is no direct connection between this wetland and a large stream or impoundment, which makes the species' presence less likely.

The open water feature, OW-27, could provide marginal foraging habitat for the bald eagle and osprey (*Pandion haliaetus*), and W-28 could provide potential migration foraging ("stop-over") habitat for the lesser yellowlegs. Although no bald eagles or ospreys (or their nests) were observed, multiple occurrences of both species have been documented in Clay County, MS, within three miles of the 92-acre Project Site (TVA 2023).

Additionally, the standing dead trees within wetland W-28 may provide potentially suitable summer roosting habitat for the federally endangered northern long-eared bat (NLEB), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) and the tricolored bat. This bat habitat would likely qualify as intermediate in quality. Within the same standing dead tree area, red-headed woodpeckers were observed nesting. Red-headed woodpeckers are a Bird of Conservation Concern within the Southeastern Coastal Plain Bird Conservation Region (USFWS 2021). Snags within wetland W-28 could also provide suitable nesting habitat for the southeastern American kestrel.

Approximately 1.9 acres of low-quality bat habitat (consisting of species such as sugarberry [*Celtis occidentalis]* and eastern red cedar [*Juniperus virginiana*]) were observed along the railroad right-of-way north of Yokohama Boulevard. While the August 2021 acoustic survey of the original Optimist Solar site did not include detectors within this 92-acre area of interest, eight detectors targeting NLEB were deployed for 12 detector nights each (77 qualifying detector-nights), which captured representative data for the entire vicinity. The August 2021 survey did not confirm the presence of NLEB; however, the acoustic survey did identify the probable presence of the tricolored bat within the original Optimist Solar site (Tetra Tech 2021). Thus, due to the presence of suitable bat foraging habitat (wetlands and forested area along the railroad ROW) and proximity of the 92-acre Project Site to the original Optimist Solar Site, the tricolored bat is assumed to be present within the 92-acre Project Site. Similar to the NLEB, conservation measures for the tricolored bat, once listed, may include time of year restrictions on tree removal and restrictions on working

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in/around hibernacula zones. Listing of the tricolored bat before or during the tree removal phase of Project construction would require consultation with USFWS.

The old fields within the Project Site could potentially provide suitable foraging habitat for the monarch butterfly and the grasshopper sparrow; however, no monarchs or milkweed plants (*Asclepias* spp.), and no grasshopper sparrows were observed on-site. The monarch butterfly is a migratory species that relies on milkweed as a primary food source during its larval (caterpillar) stage and forage on a range of flowering plants found in open fields, roadside areas, grasslands, and wetlands as a food source as an adult. This species is a candidate for federal listing, which means it is currently not subject to the USFWS Section 7/10 requirements under the ESA, therefore no further consultation would be required (USFWS 2023c).

No suitable nesting habitat for the chimney swift was observed within the 92-acre Project Site, as the site was predominantly characterized by old fields and wetlands. The Project Site is located in a rural setting, residencies in proximity to the site are too few and scattered to provide appropriate communal nesting for chimney swifts. However, scattered trees in and around the Project Site provide limited nesting habitat for the prairie warbler. No suitable habitat for Bewick's wren was observed within the Project Site, the limited forested area along the railroad ROW lacked the underbrush/thickets preferred by the species.

Price's potato bean has been historically documented to occur in Clay County, MS; however, the species is assumed to be extirpated from the area (TVA 2023). No suitable habitat for Price's potato bean was found in the 92-acre Project Site. The site lacked features indicative of potential habitat for the species, including chalk outcrops or limestone areas on ravine slopes that grade into creeks or streams. The forested areas within the survey area were small, dense, and surrounded by agricultural areas, and deemed unsuitable habitat for Price's potato bean. Marginal habitat was present for beard-tongue (*Penstemon tenuiflorus*) and ear-flower lobelia (*Lobelia appendiculata*) in the cleared old fields, but no plants were observed. No suitable habitat was found in the Project Site for the remaining plant species in Table 2.

The desktop review and initial reconnaissance determined that 35 protected and sensitive species could occur in the Project vicinity, plus two mussel species (stirrupshell and flat pigtoe) presumed to be extinct. Following the field surveys, the 92-acre Project Site was determined to contain potential suitable habitat for 12 of the 35 species. These species were the Northern long-eared bat, Rafinesque's big-eared bat, tricolored bat, bald eagle, grasshopper sparrow, lesser yellowlegs, osprey, prairie warbler, red-headed woodpecker, southeastern American kestrel, beard-tongue, and ear-flower lobelia. At this time, no additional species-specific surveys are anticipated.

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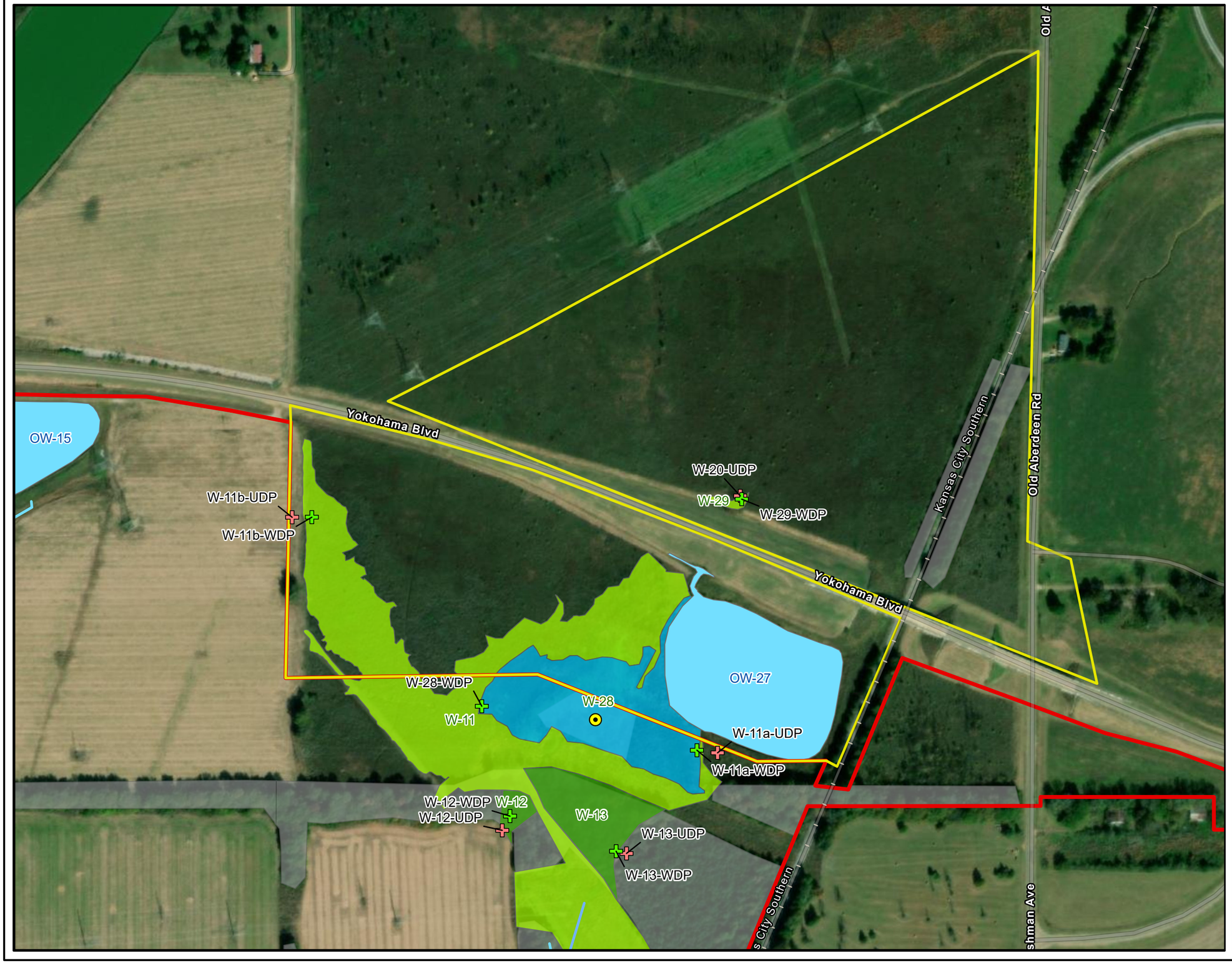
FIGURES

Tetra Tech, Inc.
117 Hearthstone Dr. Aiken, SC 29803
Tel +1.803.649.7963 | tetratech.com



Legend

- Original Project Boundary
- New Survey Area
- Potential Bat Habitat
- Red-Headed Woodpecker Nest

Previously Delineated Stream

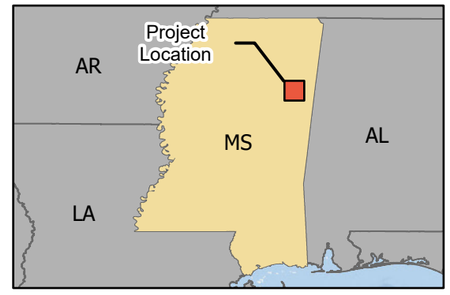
- Ephemeral
- Intermittent

Delineated Wetland

- Palustrine Aquatic Bed
- Palustrine Emergent
- Palustrine Forested
- Open Water

USACE Data Point

- Upland Plot
- Wetland Plot



N

0 175 350 700 Feet

Figure 1
Additional Biological Survey
Optimist - MS Solar 7
Clay County, MS

Prepared For: Origis Energy — POWERING THE SOLAR REVOLUTION

Prepared By: TETRA TECH

Date: 06/2023

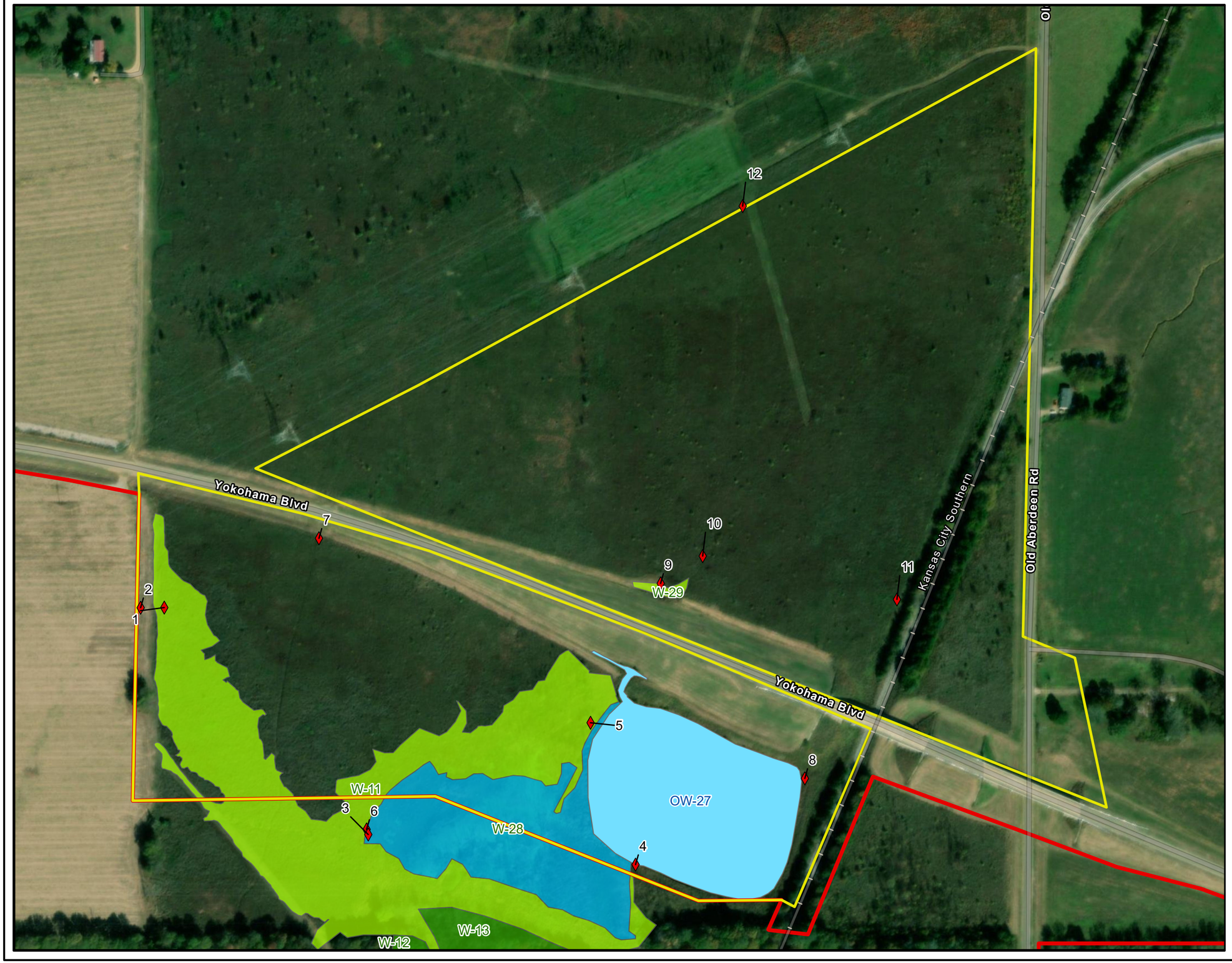
Source: Esri, et. al. 2023

Surveyed March 15, May 20, and June 2-3, 2023

Coordinate System: NAD 1983 State Plane Mississippi East FIPS 2301 (US Feet)

Document Path: C:\GIS\Data\Optimist_2023\PRO\Optimist_2023.aprx

Not for Construction

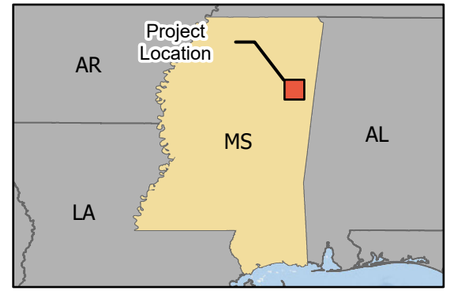


Legend

- Original Project Boundary
- New Survey Area
- Photo Location

Delineated Wetland

- Palustrine Aquatic Bed
- Palustrine Emergent
- Palustrine Forested
- Open Water



N

0 145 290 580 Feet

Figure 2
Photo Locations
Optimist - MS Solar 7
Clay County, MS

Prepared For: Origis Energy — POWERING THE SOLAR REVOLUTION

Prepared By: TETRA TECH

Date: 06/2023

Source: Esri, et. al. 2023

Surveyed March 15, May 20, and June 2-3, 2023

Coordinate System: NAD 1983 State Plane Mississippi East FIPS 2301 (US Feet)

Document Path: C:\GIS\Data\Optimist_2023\PRO\Optimist_2023.aprx

Not for Construction

APPENDIX A – USACE WETLAND DETERMINATION DATA FORMS

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain 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: Optimist City/County: Clay County Sampling Date: 6/2/2023

Applicant/Owner: Origis State: MS Sampling Point: W29-Up

Investigator(s): Chris Kul Section, Township, Range: S35 T16S R6E

Landform (hillside, terrace, etc.): lowland Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 33.639378 Long: -88.636360 Datum: NAD 83

Soil Map Unit Name: OkB - Okolona silty clay NWI classification: upland

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 – 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)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

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: W29-Up

Tree Stratum (Plot size: 30x30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30x30)			
1. *Apocynum cannabinum*	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40 =Total Cover		
50% of total cover: 20	20% of total cover:	8	
Herb Stratum (Plot size: 30x30)			
1. *Solidago altiplanities*	20	Yes	UPL
2. *Desmanthus virgatus*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 =Total Cover		
50% of total cover: 20	20% of total cover:	8	
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: 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	60	x 4 =	240
UPL species	20	x 5 =	100
Column Totals:	80 (A)		340 (B)
Prevalence Index = B/A =			4.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 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 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: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W29-Up

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 5/3	80					Loamy/Clayey	20% 10YR 4/3

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ 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 – Atlantic and Gulf Coastal Plain 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: Optimist City/County: Clay County Sampling Date: 6/2/2023

Applicant/Owner: Origis State: MS Sampling Point: W29-Wet

Investigator(s): Chris Kul Section, Township, Range: S35 T16S R6E

Landform (hillside, terrace, etc.): lowland Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 33.639359 Long: -88.636343 Datum: NAD 83

Soil Map Unit Name: OkB - Okolona silty clay NWI classification: upland

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 – 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:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X 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)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

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:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W29-Wet

Tree Stratum (Plot size: 30x30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30x30)			
1. *Apocynum cannabinum*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover:	2	
Herb Stratum (Plot size: 30x30)			
1. *Hypericum fasciculatum*	10	Yes	FACW
2. *Lachnocaulon anceps*	10	Yes	FACW
3. *Andropogon glomeratus*	10	Yes	FACW
4. *Rhynchospora corniculata*	10	Yes	OBL
5. *Cyperus difformis*	10	Yes	OBL
6. *Juncus effusus*	10	Yes	OBL
7. *Solidago altiplanities*	5	No	UPL
8. *Desmanthus virgatus*	5	No	FACU
9.			
10.			
11.			
12.			
	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: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	5	x 5 =	25
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]

___ 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 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: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W29-Wet

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	80					Loamy/Clayey	20% masked 10YR 2/1
4-14	10YR 5/2	80	10YR 6/6	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: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- X Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ 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 – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; 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: Optimist City/County: Clay County Sampling Date: 03/15/2023
Applicant/Owner: Origis State: MS Sampling Point: U11b
Investigator(s): HM Section, Township, Range: S35 T16S R6E
Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
Subregion (LRR or MLRA): LRR P, MLRA 135A Lat: 33.639198 Long: -88.641561 Datum: NAD83
Soil Map Unit Name: OkA - Okalona Silty Clay, 0 to 1 percent slopes 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 ____, 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 – 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 X	No ____	
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)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Geomorphic Position (D2)
- X Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

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 (Five Strata) – Use scientific names of plants. Sampling Point: U11b

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Poa annua*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30 =Total Cover		
50% of total cover: 15	20% of total cover: 6		
Woody Vine Stratum (Plot size: 30)			
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	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	30 (A)		120 (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]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

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

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: U11b

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 3/1	99	10YR 5/8	1	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: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- X Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Compaction

Depth (inches): 14

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

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; 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: Optimist City/County: Clay County Sampling Date: 03/15/2023
Applicant/Owner: Origis State: MS Sampling Point: W11b
Investigator(s): HM Section, Township, Range: S35 T16S R6E
Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Convace Slope (%): 0-1
Subregion (LRR or MLRA): LRR P, MLRA 135A Lat: 33.639199 Long: -88.641332 Datum: NAD83
Soil Map Unit Name: OkA - Okalona Silty Clay, 0 to 1 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 ____, 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 – 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:

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)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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 Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- X Sphagnum Moss (D8) **(LRR T, U)**

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): 4

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

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: W11b

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1. *Celtis laevigata*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Shrub Stratum (Plot size: 15)			
1. *Celtis laevigata*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	30	Yes	OBL
2. *Solidago canadensis*	20	Yes	FACU
3. *Rubus argutus*	10	No	FAC
4. *Ranunculus sardous*	5	No	FAC
5. *Dichanthelium scoparium*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 30)			
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	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	85 (A)		195 (B)
Prevalence Index = B/A =			2.29

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

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

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W11b

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
0-16	10YR 3/1	98	10YR 5/8	2	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: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- X Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ 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 – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; 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: Optimist City/County: Clay County Sampling Date: 03/15/2023
Applicant/Owner: Origis State: MS Sampling Point: W28
Investigator(s): HM Section, Township, Range: S35 T16S R6E
Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1
Subregion (LRR or MLRA): LRR P, MLRA 135A Lat: 33.637362 Long: -88.639366 Datum: NAD83
Soil Map Unit Name: BrB - Brooksville Silt Clay, 1 to 3 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 ____, 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 – 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:

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ 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)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 12
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:
Beaver activity was noted and appears to be heavily manipulating the hydrology of the area.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: W28

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	5 =Total Cover		
50% of total cover: 3	20% of total cover: 1		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1. *Sesbania drummondii*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	15 =Total Cover		
50% of total cover: 8	20% of total cover: 3		
Herb Stratum (Plot size: 5)			
1. *Ludwigia peploides*	15	Yes	OBL
2. *Potamogeton nodosus*	15	Yes	OBL
3. *Eleocharis obtusa*	10	Yes	OBL
4.			
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: 30)			
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	40	x 1 =	40
FACW species	15	x 2 =	30
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		85 (B)
Prevalence Index = B/A =			1.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

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

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W28

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
0-10	10YR 3/2	90	10YR 5/8	10	C	M	Loamy/Clayey	Prominent redox concentrations
10-16	10YR 4/2	98	10YR 5/8	2	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: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ 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:

APPENDIX B – PHOTOGRAPHIC LOG

Photo No.: 1

Description:

View of W-11b wetland data point location.

Direction:
Facing east.

Photo No.: 2

Description:

View of W-11b upland data point location.

Direction:

Facing north.

Photo No.: 3

Description:

View of W-28 wetland data point location. Bat habitat can be seen in the background of the photo.

Direction:

Facing east.

Photo No.: 4

Description:

View of OW-27.

Direction:

Facing northwest.

Photo No.: 5

Description:

View of recent tree removal by a beaver.

Direction:
Facing west.

Photo No.: 6

Description:

View of impoundment created by a beaver dam. The beaver dam can be seen in the center of the photo.

Direction:

Facing southeast.

Photo No.: 7

Description:

View of the recently burned upland area within the parcel.

Direction:

Facing southwest.

Photo No.: 8

Description:

View of OW-27.

Direction:

Facing northwest.

Photo No.: 9

Description:

View of culvert installed under Yokohama Boulevard at W-29.

Direction:

Facing south.

Photo No.: 10

Description:

View of upland field north of W-29.

Direction:

Facing north.

Photo No.: 11

Description:

View of the Yohohama Boulevard overpass and fragmented forest along the railroad rated low quality for bat habitat.

Direction:

Facing south.

Photo No.: 12

Description:

View of upland field from the transmission right-of-way facing Yokohama Boulevard.

Direction:

Facing southeast.

APPENDIX C – TVA RAM FORMS

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality
TVARAM FIELD FORM

Site: W29	**Rater(s):** CK	**Date:** 06/02/2023

Metric 1. Wetland Area (size)

1 (max 6 pts.) | 1 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☐ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☑ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☐ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

GIS

Metric 2. Upland Buffers and Surrounding Land Use

3 (max 14 pts.) | 4 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☑ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☑ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☐ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

10 (max 30 pts.) | 14 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☑ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g., forest), complex (1)
- ☑ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☐ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☑ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☑ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ ditch
- ☑ tile (including culvert)
- ☐ dike
- ☐ weir
- ☑ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☑ road bed/RR track
- ☐ dredging
- ☐ other _____

Metric 4. Habitat Alteration and Development

7 (max 20 pts.) | 21 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☑ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☑ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ farming
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed
- ☐ removal woody debris removal
- ☐ sedimentation
- ☐ dredging
- ☐ nutrient enrichment

21
Subtotal

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality
TVARAM FIELD FORM

Site: W29	**Rater(s):** CK	**Date:** 06/02/2023

21
subtotal previous page

0 (max 10 pts.) | 21 (subtotal)

Metric 5. Special Wetlands

0
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☐ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☐ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

4 (max 20 pts.) | 25 (subtotal)

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- [1] Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☑ Moderate (3)[BR/CM (5)]
- ☐ Moderately low (2) [BR/CM (3)]
- ☐ Low (1) [BR/CM (2)]
- ☐ None (0)

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☑ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussocks
- ☐ Coarse woody debris >15 cm (6 in.)
- ☐ Standing dead >25 cm (10 in.) dbh
- ☐ Amphibian breeding pools

Vegetation Community Cover Scale

0 =	Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 =	Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 =	Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 =	Present and comprises a significant part or more of wetland's vegetation and is of high quality

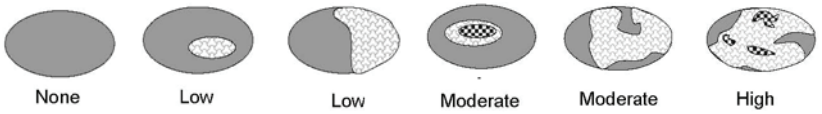
Narrative Description of Vegetation Quality

low =	Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod =	Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high =	A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

Mudflat and Open Water Class Quality

0 =	Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 =	Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

0 =	Absent
1 =	Present in very small amounts or if more common of marginal quality
2 =	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 highest quality

GRAND TOTAL (max 100 pts)

25

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality
TVARAM FIELD FORM

Site: W11	**Rater(s):** HM	**Date:** 03/15/2023

Metric 1. Wetland Area (size)

4 (max 6 pts.) | 4 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☑ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☐ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☐ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☐ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):
12.29 acres

Metric 2. Upland Buffers and Surrounding Land Use

7 (max 14 pts.) | 11 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☑ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☑ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☐ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

15 (max 30 pts.) | 26 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☑ Seasonal/intermittent surface water (3)
- ☑ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☑ 100-year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g., forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☑ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☐ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☐ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ ditch
- ☑ tile (including culvert)
- ☐ dike
- ☐ weir
- ☐ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☑ road bed/RR track
- ☐ dredging
- ☐ other _____

Metric 4. Habitat Alteration and Development

15 (max 20 pts.) | 41 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☑ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☑ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☑ Recovered (6)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☑ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ farming
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed
- ☐ removal woody debris removal
- ☐ sedimentation
- ☐ dredging
- ☐ nutrient enrichment

41
Subtotal

Site: W11	**Rater(s):**	**Date:**

41
subtotal previous page

10 (max 10 pts.) | 51 (subtotal)

Metric 5. Special Wetlands

15
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- [✓] Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- [✓] Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- [ ] Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- [✓] Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- [ ] Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- [ ] Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- [ ] Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- [ ] Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- [ ] Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- [ ] Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- [ ] Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

15 (max 20 pts.) | 66 (subtotal)

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- [2] Aquatic bed
- [2] Emergent
- [1] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water <20 acres (8 ha)
- [ ] Moss/lichen. Other _____

6b. Horizontal (plan view) interspersion.
Select only one.

- [ ] High (5)
- [✓] Moderately high (4) [BR/CM (5)]
- [ ] Moderate (3)[BR/CM (5)]
- [ ] Moderately low (2) [BR/CM (3)]
- [ ] Low (1) [BR/CM (2)]
- [ ] None (0)

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [✓] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [2] Vegetated hummocks/tussocks
- [2] Coarse woody debris >15 cm (6 in.)
- [2] Standing dead >25 cm (10 in.) dbh
- [1] Amphibian breeding pools

Vegetation Community Cover Scale

0 =	Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 =	Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 =	Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 =	Present and comprises a significant part or more of wetland's vegetation and is of high quality

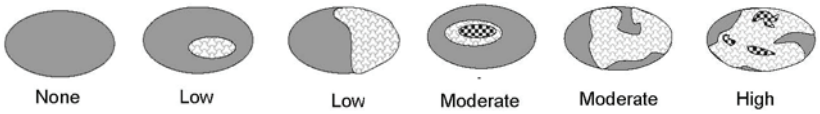
Narrative Description of Vegetation Quality

low =	Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod =	Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high =	A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

Mudflat and Open Water Class Quality

0 =	Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 =	Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

0 =	Absent
1 =	Present in very small amounts or if more common of marginal quality
2 =	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 highest quality

GRAND TOTAL (max 100 pts)

66

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality
TVARAM FIELD FORM

Site: W28	**Rater(s):** HM	**Date:** 03/15/2023

Metric 1. Wetland Area (size)

3 (max 6 pts.) | 3 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☑ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☐ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☐ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

GIS

Metric 2. Upland Buffers and Surrounding Land Use

9 (max 14 pts.) | 12 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☑ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☑ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☐ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

16 (max 30 pts.) | 2 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☑ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☑ Between stream/lake and other human use (1)
- ☑ Part of wetland/upland (e.g., forest), complex (1)
- ☑ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☑ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☐ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☑ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☐ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☑ ditch
- ☐ tile (including culvert)
- ☐ dike
- ☐ weir
- ☑ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☐ road bed/RR track
- ☐ dredging
- ☐ other _____

Metric 4. Habitat Alteration and Development

12 (max 20 pts.) | 40 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☑ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☑ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ farming
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☑ herbaceous/aquatic bed
- ☐ removal woody debris removal
- ☐ sedimentation
- ☐ dredging
- ☐ nutrient enrichment

40
Subtotal

Site:	Rater(s):	Date:

40
subtotal previous page

5 (max 10 pts.) | 45 (subtotal)

Metric 5. Special Wetlands

5
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☐ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☑ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

13 (max 20 pts.) | 58 (subtotal)

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- [2] Aquatic bed
- [2] Emergent
- [1] Shrub
- [1] Forest
- ☐ Mudflats
- [1] Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☑ Moderate (3)[BR/CM (5)]
- ☐ Moderately low (2) [BR/CM (3)]
- ☐ Low (1) [BR/CM (2)]
- ☐ None (0)

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☑ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussocks
- [1] Coarse woody debris >15 cm (6 in.)
- [3] Standing dead >25 cm (10 in.) dbh
- ☐ Amphibian breeding pools

Vegetation Community Cover Scale

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Mudflat and Open Water Class Quality

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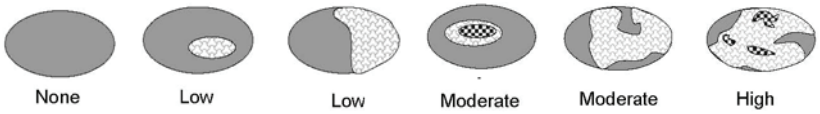
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

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3 =	Present in moderate or greater amounts and of highest quality

GRAND TOTAL (max 100 pts)

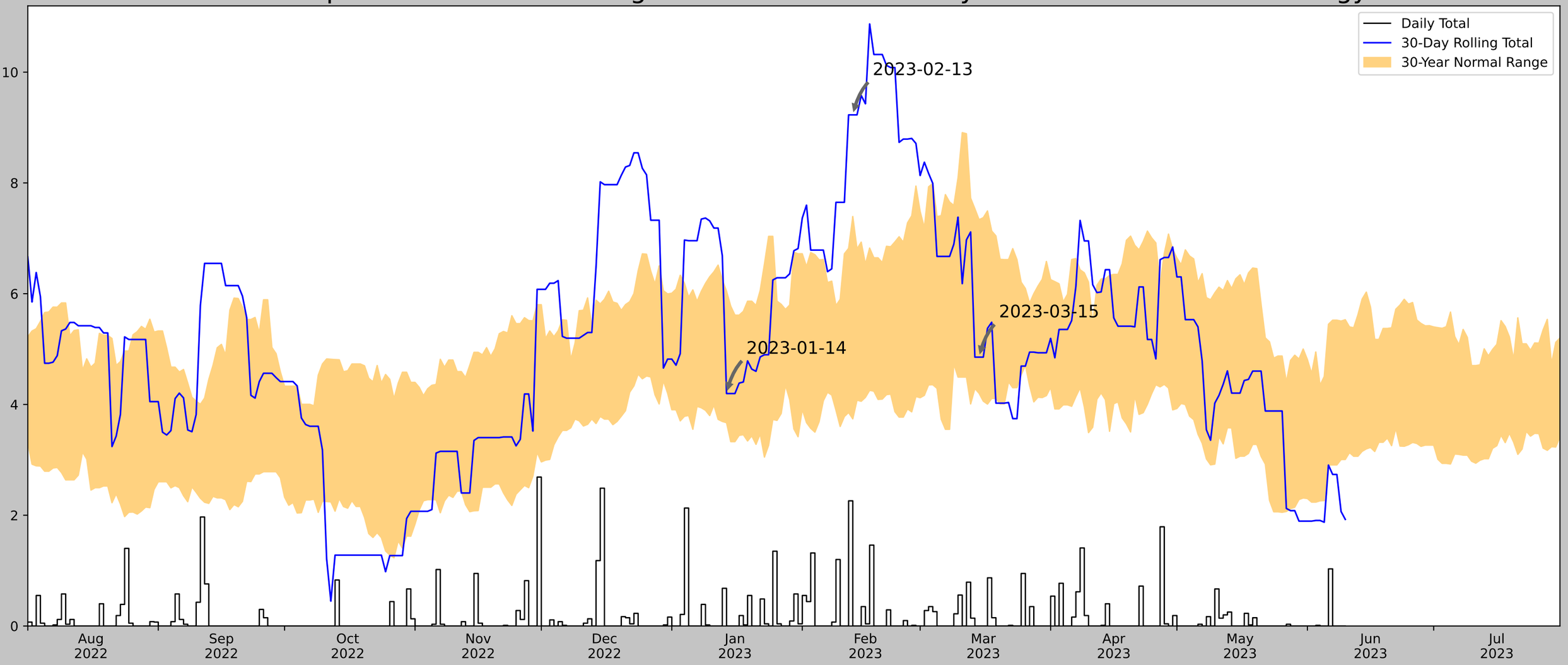
58

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

APPENDIX D – USACE ANTECEDENT PRECIPITATION TOOL RESULTS

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.638424, -88.639123
Observation Date	2023-03-15
Elevation (ft)	258.994
Drought Index (PDSI)	Normal
WebWIMP H_2O Balance	Wet Season

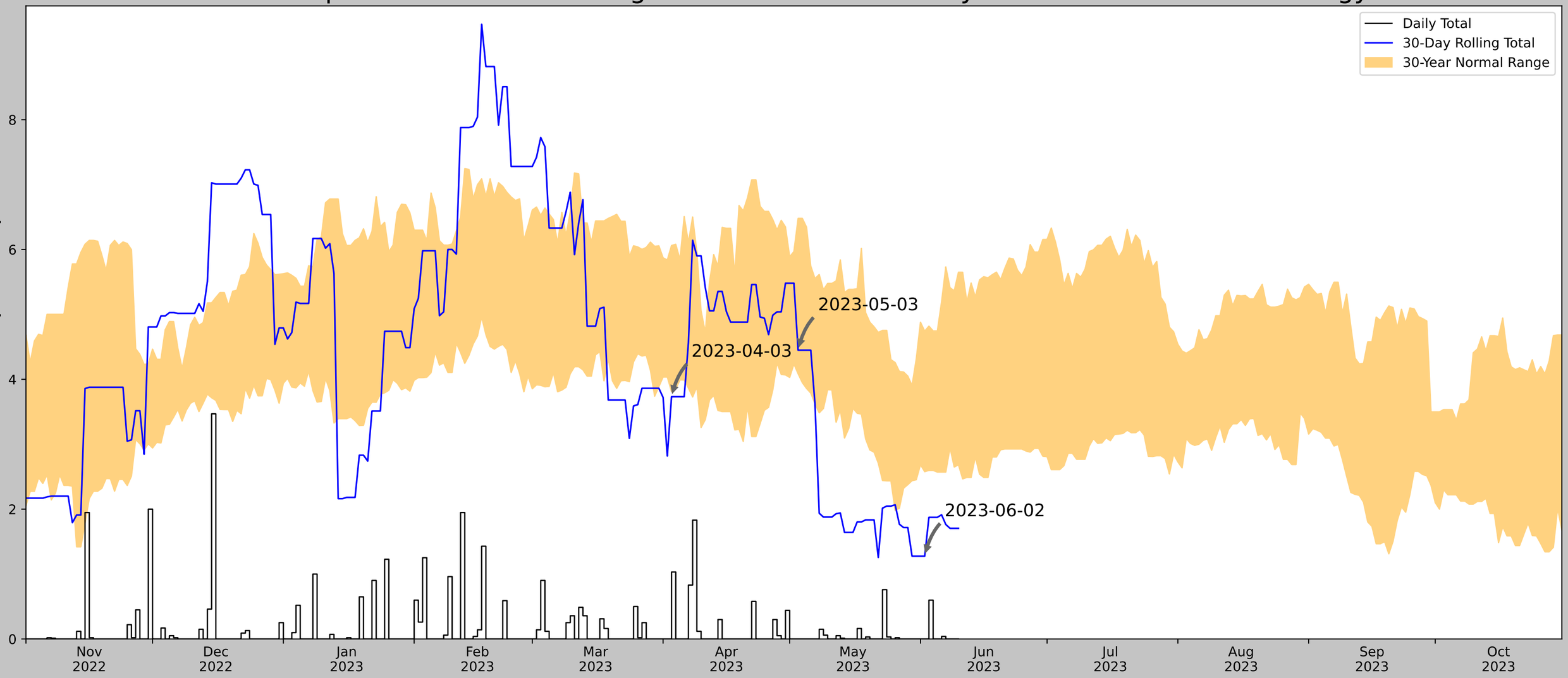
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-03-15	4.201181	7.336614	4.854331	Normal	2	3	6
2023-02-13	3.73937	7.394488	9.228347	Wet	3	2	6
2023-01-14	3.670866	6.046851	4.196851	Normal	2	1	2
Result							Normal Conditions - 14

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
STATE UNIV	33.4692, -88.7822	185.039	14.303	73.955	7.494	10023	88
STARKVILLE 3.2 E	33.4559, -88.7668	331.037	1.278	145.998	0.762	3	0
STARKVILLE 0.4 ENE	33.4593, -88.8164	351.05	2.087	166.011	1.286	584	0
STARKVILLE 3.8 NNE	33.5071, -88.7971	324.147	2.756	139.108	1.624	0	2
STARKVILLE 4.7 SE	33.4033, -88.773	288.058	4.584	103.019	2.535	16	0
STARKVILLE 2.7 WSW	33.4414, -88.8648	298.885	5.134	113.846	2.895	151	0
STARKVILLE 3.0 WSW	33.4387, -88.8695	310.039	5.456	125.0	3.137	34	0
STARKVILLE 5.3 S	33.3808, -88.8091	314.961	6.302	129.922	3.655	12	0
TIBBEE	33.5378, -88.6331	209.974	9.811	24.935	4.66	434	0
BLUFF LAKE	33.2781, -88.7931	229.987	13.219	44.948	6.543	64	0
CRAWFORD 5 W	33.2783, -88.7061	252.953	13.902	67.914	7.2	32	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.638424, -88.639123
Observation Date	2023-06-02
Elevation (ft)	258.994
Drought Index (PDSI)	Incipient drought (2023-05)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-06-02	2.577559	4.74252	1.275591	Dry	1	3	3
2023-05-03	4.085433	6.479528	4.448819	Normal	2	2	4
2023-04-03	3.810236	6.061811	3.732284	Dry	1	1	1
Result							Drier than Normal - 8

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MACON 3N	33.1544, -88.5586	250.0	33.764	8.994	15.497	9929	67
BROOKSVILLE EXP STN	33.2597, -88.5636	291.995	7.281	41.995	3.582	114	0
CRAWFORD 5 W	33.2783, -88.7061	252.953	12.082	2.953	5.473	478	0
BLUFF LAKE	33.2781, -88.7931	229.987	16.025	20.013	7.532	1	0
BEVILL L&D	33.21, -88.2878	165.026	16.124	84.974	8.626	772	22
GOLDEN TRIANGLE	33.45, -88.5833	264.108	20.474	14.108	9.502	42	1
FORRESTON 1.4 SW	33.3214, -88.3274	146.982	17.654	103.018	9.763	1	0
STARKVILLE 6.3 SSE	33.3673, -88.7975	305.118	20.171	55.118	10.189	4	0
STARKVILLE 4.7 SE	33.4033, -88.773	288.058	21.192	38.058	10.343	5	0
STARKVILLE 5.3 S	33.3808, -88.8091	314.961	21.31	64.961	10.974	7	0

APPENDIX E – INFORMATION FOR PLANNING AND CONSULTING (IPaC)

IPaC resource list

IPaC is experiencing an issue that prevents official species lists and determination key letters from generating. You may see an error. We are working on the issue and hope to have it resolved soon. ×

This ...cal habi...'s (US...nced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Clay County, Mississippi

Local office

Mississippi Ecological Services Field Office

(601) 965-4900
(601) 965-4340

6578 Dogwood View Parkway, Suite A

[redacted]
Jackson, MS 39213-7856

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Reptiles

NAME	STATUS
Alligator Snapping Turtle Macrochelys temminckii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Price''s Potato-bean Apios priceana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7422	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

There are no documented cases of eagles being present at this location. However, if you believe eagles may be using your site, please reach out to the local Fish and Wildlife Service office.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date

range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel Falco sparverius paulus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

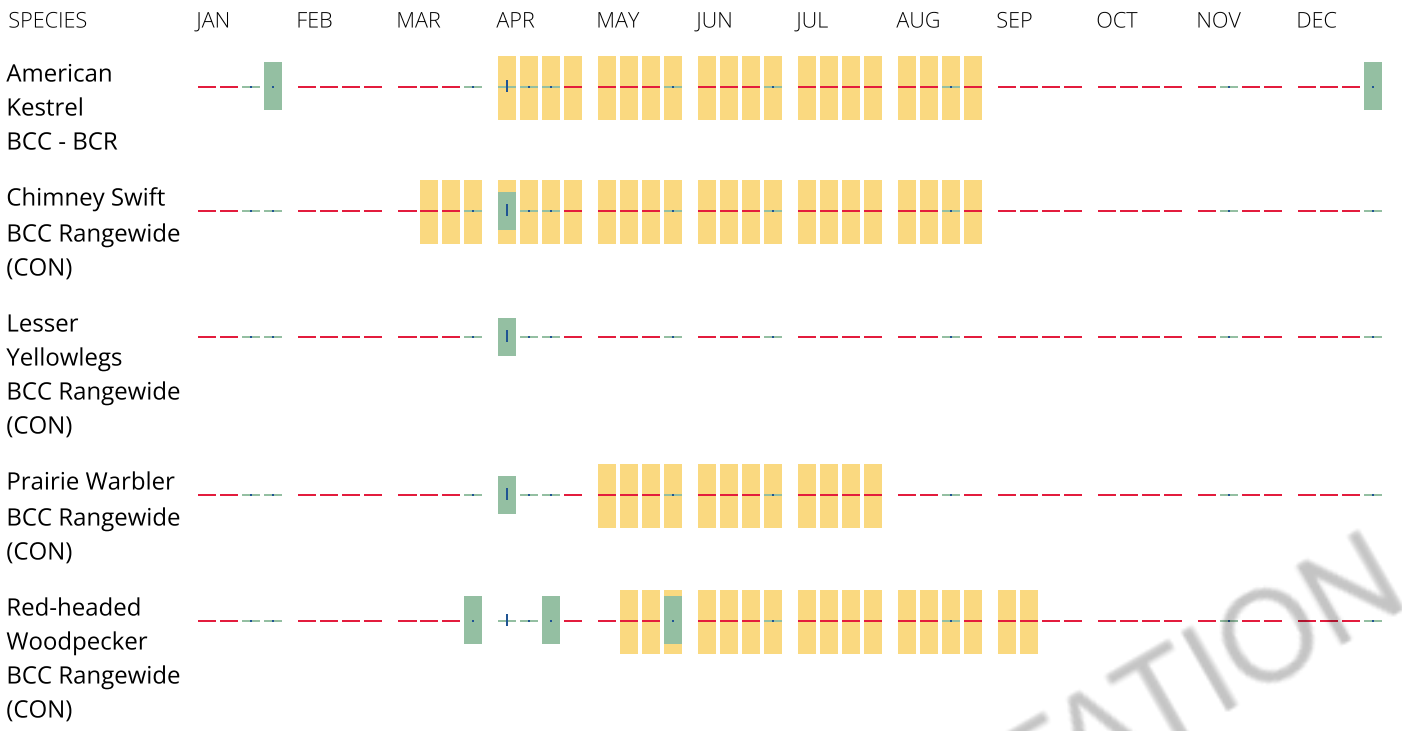
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies.

Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX F - TVA REGIONAL NATURAL HERITAGE DATABASE RESULTS

TVA Regional Natural Heritage Database
Botany 5-Mile

OBJECT ID	EO_ID	EO_NUM	EOCODE	SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK	STATE STATUS	BASIC_EO_RANK	FEDERAL STATUS	EO_DATA	FIRST_OBSERVED_DATE	LAST_OBSERVED_DATE	SURVEY_DATE	GlobalID	DISC_SUBCAT
2872325	9138	31	PDBUX02010	*Pachysandra procumbens*	Allegheny-spurge	CLAY	MS	S3		H? - Possibly historical			1976-09-01	1976-09-01	1976-09-01	{EC5601AB-7D3F-4AAC-A4C0-03A114AC3E4D}	Plants and Champion Trees
2872648	8799	20	PDSCR1L640	*Penstemon tenuiflorus*	Beard-tongue	CLAY	MS	S3		H? - Possibly historical		[1990]: DUNCAN OBSERVED 1-10 PLANTS IN FLOWER ON MARCH 25 (MSHP).	1990-03-25	1990-03-25	1990-03-25	{AAF25456-FE57-4604-A631-B4143B318F27}	Plants and Champion Trees
2873603	11337	16	PDAPI1K060	*Osmorhiza longistylis*	Smoother Sweet-cicely	CLAY	MS	S3		H? - Possibly historical		[1988]: DUNCAN OBSERVED ONLY 7 PLANTS ON MAY 1 (DROUGHT YEAR) (MSHP).	1988-05-01	1988-05-01	1988-05-01	{4E0AD7F9-19D7-46BE-9DB1-20EB0A22CE3F}	Plants and Champion Trees
2873879	8440	7	PMLIL1A0P0	*Lilium superbum*	Turk's Cap Lily	CLAY	MS	S3S4		H? - Possibly historical		ONLY 24 PLANTS, 5-10 SQ MI AREA.	1988-05-01	1988-05-01	1988-05-01	{7B8F5745-3A4D-4D6B-B3D7-C2B06C127E54}	Plants and Champion Trees
2874577	13213	5	PDFAG05190	*Quercus macrocarpa*	Bur Oak	CLAY	MS	S2		H - Historical		LOCAL.	1981-12-08	1981-12-08	1981-12-08	{0F375AD9-466E-4770-AF8D-875DD8F8EDAA}	Plants and Champion Trees
2875659	14859	5	PDLAM1S1U0	*Salvia urticifolia*	Nettle-leaf Sage	CLAY	MS	S2		H? - Possibly historical		[1988]: DUNCAN OBSERVED 11-50 PLANTS ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{EFB087AB-3A7C-446F-9EE9-90E3D06B2AE4}	Plants and Champion Trees
2877040	16471	8	PDAQU010N0	*Ilex montana*	Mountain Holly	CLAY	MS			H? - Possibly historical		[1988]: DUNCAN OBSERVED 11-50 INDIVIDUALS OVER AREA <1 HA ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{9B66816E-D635-491F-9338-7DC49F205BA8}	Plants and Champion Trees
2879731	17976	147	PDARA09010	*Panax quinquefolius*	American ginseng	CLAY	MS	S3		H? - Possibly historical		[1988]: DUNCAN OBSERVED 51-100 INDIVIDUALS OF EXCELLENT VIGOR OVER 10 SQ M ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{547A9655-95F7-472D-842A-B329720E8F27}	Plants and Champion Trees
2881133	19490	17	PDARI02024	*Asarum canadense var. reflexum*	Canada Wild Ginger	CLAY	MS	S3		H? - Possibly historical		[1988]: DUNCAN OBSERVED 11-50 INDIVIDUALS IN 10 SQ M AREA ON SLOPE DIRECTLY ABOVE CYPRESS-TUPELO GUM SWAMP ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{7C284F70-2953-4C0A-85DB-80E8248B4E6F}	Plants and Champion Trees
2884210	26963	9	PDAST2L010	*Coreopsis auriculata*	Lobed Tickseed	CLAY	MS	S2S3		H? - Possibly historical		[1988]: DUNCAN OBSERVED OVER 1,000 PLANTS SCATTERED OVER 1 SQ MI ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{42586C22-DA7F-4FF2-869E-BA6A75882968}	Plants and Champion Trees
2885402	28513	15	PDSTA01020	*Staphylea trifolia*	American Bladdernut	CLAY	MS	S3		H? - Possibly historical		[1988]: DUNCAN OBSERVED 11-50 PLANTS OVER ~1 HA ON MAY 1 (MSHP).	1988-05-01	1988-05-01	1988-05-01	{510BC846-954B-4B16-A49D-3733463FC1BA}	Plants and Champion Trees
2887340	33595	75	PMLIL1A0P0	*Lilium superbum*	Turk's Cap Lily	CLAY	MS	S3S4		E - Verified extant (viability not assessed)		[2005]: TVA REPORTED ~33 TURK'S CAP LILY PLANTS.	2005-04-01	2005-04-01	2005-04-00	{5073154B-E62D-410E-890F-1F6587181EF6}	Plants and Champion Trees
2887341	33596	14	PMLIL0E050	*Camassia scilloides*	Wild Hyacinth	CLAY	MS	S2		E - Verified extant (viability not assessed)		[2005]: TVA REPORTED A POPULATION OF 76 WILD HYACINTHS.	2005-04-01	2005-04-01	2005-04-00	{CFEB0D6C-3A66-4844-AF1A-D9E7147AE938}	Plants and Champion Trees
2890738	33562	15	PDAPI1U010	*Polytaenia nuttallii*	Prairie Parsley	CLAY	MS	S2		E - Verified extant (viability not assessed)		[2005]: TVA REPORTED 5 PRAIRIE PARSELY.	2005-04-01	2005-04-01	2005-04-00	{8EFD758F-04B1-4003-84A3-9816D4AF3999}	Plants and Champion Trees
2892736	28502	7	PDMNS05010	*Menispermum canadense*	Canada Moonseed	CLAY	MS	S3		H? - Possibly historical			1976-09-01	1976-09-01	1976-09-01	{48774F07-F495-45F9-BF53-54449C45A36C}	Plants and Champion Trees

TVA Regional Natural Heritage Database
Federal Only

OBJECTID	EO_ID	EO_NUM	EOCODE	SCIENTIFIC_NAME	COMMON_NAME	COUNTY	STATE	ST_RANK	ST_STATUS	BASIC_EO_RANK	FED_STATUS	EO_DATA	FIRST_OBSERVED_DT	LAST_OBSERVED_DT	SURVEY_DT	GlobalID	DISC_SUBCAT
2867307	105	48	IMBIV35410	*Pleurobema decisum*	Southern Clubshell	CLAY	MS	S1		X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED 1 SPECIMEN COLLECTED BY SCHULTZ AND PIERSON, AUG 4, 1980 (MMNS SPECIMEN #1139).	1980-08-04	1980-08-04	1980-08-04	{C9B6E7CF-FF6E-4FF8-86E4-C98E557F03DF}	Aquatic Animals
2867447	316	13	IMBIV35230	*Pleurobema perovatum*	Ovate Clubshell	CLAY	MS	S1	LE	X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED A SPECIMEN COLLECTED BY J.D. WILLIAMS AND R. GRACE ON FEB 8, 1978 (OSUM SPECIMEN #36197).	1978-02-08	1978-02-08	1978-02-08	{B4D799FB-830F-4544-B49A-F0E0E166BE9A}	Aquatic Animals
2869162	3102	21	IMBIV16130	*Epioblasma penita*	Southern Combshell	CLAY	MS	S1	LE	X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED ONE SPECIMEN COLLECTED BY GRACE ET AL. IN 1976 (MMNS SPECIMEN #2751); AND ALSO REPORTED 1.5 SPECIMENS COLLECTED BY PIERSON ON 26 MAY 1980 (MMNS SPECIMEN #719).	1976-01-01	1980-05-26	1980-05-26	{D1B96EDD-2A50-4AC4-B776-67E0F5534A87}	Aquatic Animals
2871774	6213	1	IMBIV35180	*Pleurobema marshalli*	Flat Pigtoe	CLAY	MS	SX	LE	X - Extirpated	E, PDL	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED TEN SPECIMENS COLLECTED FROM THIS LOCALITY BY JAMES D. WILLIAMS AND D.H. STANSBERY ON 29 MAY 1972, UPPERMOST SITE (OSUM SPECIMEN # 36304:101).	1972-05-29	1972-05-29	1972-05-29	{269455EE-C765-40FF-ACFE-CD3DDCC01119}	Aquatic Animals
2875067	9871	1	IMBIV39160	*Quadrula stapes*	Stirrupshell	CLAY	MS	SX	LE	X - Extirpated	E, PDL	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED ONE SPECIMEN COLLECTED FROM THIS LOCALITY IN 1972, ACCORDING TO STANSBERY (OSUM SPECIMEN/CAT #36298:101).	1972-01-01	1972-01-01	1972-01-01	{7D9C5038-AB08-422D-8C86-3027FAA0FD82}	Aquatic Animals
2878496	16128	17	PDFAB0D020	*Apios priceana*	Price's Potato-bean	CLAY	MS	S1		X - Extirpated	T	15-20 PLANTS ON 10-20 M OF STREAM. ON LOWLAND PRAIRIE ON DE MOPOLIS FORMATION. CHARACTERISTIC WOODY PLANTS WERE JUNIPERU S VIRGINIANA, CARYA ILLINOENSIS, QUERCUS MUEHLENBERGII UNUSU AL WOODY PLANTS WERE ULMUS SEROTINA, EUONYMUS ATROPURPUREUS.	1967-01-01	1986-07-10	2000-09-29	{15E43203-9CA2-456F-80A0-DE0351CEB82B}	Plants and Champion Trees
2880223	20230	12	IMBIV16130	*Epioblasma penita*	Southern Combshell	CLAY	MS	S1	LE	X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED 2 SPECIMENS COLLECTED FROM THIS LOCALITY BY WILLIAMS AND PEARSON ON 25 JULY 1972 (OSUM SPECIMEN #34016:301).	1972-07-25	1972-07-25	1972-07-25	{FB47ACE9-DB2A-448D-917F-0DD7FE306229}	Aquatic Animals
2883589	25503	26	AFCKA02170	*Noturus munitus*	Frecklebelly Madtom	CLAY	MS	S2	LE	H? - Possibly historical	PS:T	MSNHP REPORTED 1 SPECIMEN TAKEN IN SEINE BY H.T. BOSCHUNG IN 1973 AT THIS LOCATION.	1972-07-25	1972-07-25	1972-07-25	{55F352FA-E16C-4363-849B-60FD4E4A3DB9}	Aquatic Animals
2884836	29674	177	ABNKC10010	*Haliaeetus leucocephalus*	Bald Eagle	CLAY	MS	S3B,S2N		H - Historical	DL	OLD NEST SITE, NOW INACTIVE. THE MOST RECENT NESTING INFORMATION FOR THIS PAIR IS REPRESENTED BY EO 132.				{82AD3DED-35D3-4D18-AE66-1B58827B159C}	Terrestrial Animals
2885536	28573	42	IMBIV35410	*Pleurobema decisum*	Southern Clubshell	CLAY	MS	S1		X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED A SPECIMEN COLLECTED FROM THIS LOCALITY ON FEB 8, 1978 ACCORDING TO STANSBERY (OSUM SPECIMEN #36196).	1978-02-08	1978-02-08	1978-02-08	{7598B324-6EDA-4096-8EB1-420AB7018DC5}	Aquatic Animals
2886165	29392	132	ABNKC10010	*Haliaeetus leucocephalus*	Bald Eagle	CLAY	MS	S3B,S2N		AC - Excellent, good, or fair estimated viability	DL	HENRY, LISKEY AND HARTLEY REPORTED TWO ADULTS AT THIS NEST BETWEEN 28 FEBRUARY AND 2 MARCH 2005. HENRY OBSERVED TWO ADULTS AT THE NEST IN APRIL, 2005. THIS PAIR MOVED FROM TV*177.	2005-02-28	2005-04-01	2005-02-28	{F9041DCF-5FD6-4415-BA85-2D187C3A533F}	Terrestrial Animals
2898540	45081	8	ARAAD05090	*Graptemys pulchra*	Alabama Map Turtle	CLAY	MS	S2?		Not ranked	PSAT		1995-08-21	2004-05-26	2004-05-26	{0A0A97FC-1495-4075-A60F-E55A023743D0}	Terrestrial Animals
2903350	11538	24	IMBIV16130	*Epioblasma penita*	Southern Combshell	CLAY	MS	S1	LE	X - Extirpated	E	MISSISSIPPI HERITAGE (2002 DATA EXCH) REPORTED THE SPECIES PRESENT IN 1978, ACCORDING TO STANSBERY (NO SPECIFICS GIVEN).	1978-02-08	1978-02-08	1978-02-08	{F71189F4-DAC0-433F-BB81-A02140453100}	Aquatic Animals
2903595	7260	4	PDFAB0D020	*Apios priceana*	Price's Potato-bean	CLAY	MS	S1		H - Historical	T	(VEGETATIVE).	1968-09-09	1968-09-09	1968-09-09	{26357E18-0C89-43B9-8EE7-C5F11A9D867C}	Plants and Champion Trees

TVA Regional Natural Heritage Database
TZ 3-Mile

OBJECTID	EO_ID	EO_NUM	EOCODE	SCIENTIFIC_NAME	COMMON_NAME	COUNTY	STATE	ST_RANK	ST_STATUS	BASIC_EO_RANK	FED_STATUS	EO_DATA	FIRST_OBSERVED_DT	LAST_OBSERVED_DT	SURVEY_DT	GlobalID	DISC_SUBCAT
2894028	47566	1252	ABNKC01010	*Pandion haliaetus*	Osprey	CLAY	MS	S3B,S1S2N		Not ranked			2013-12-11	2013-12-11	2013-12-11	{90FDE08C-3086-402B-9602-1D64024F043E}	Terrestrial Animals
2894835	38675	288	AMACC08020	*Corynorhinus rafinesquii*	Rafinesque's Big-eared bat	CLAY	MS	S3		Not ranked				2005-01-01		{D7AEE0C8-14ED-4750-B3C1-8C855EABC2C5}	Terrestrial Animals

APPENDIX G – MNHP HERITAGE SPATIAL DATA REQUEST

Mississippi Natural Heritage Program
List of Species within 2-mile radius of Project Site

Scientific Name	Common Name	Federal Status	State Status	State Rank
Ammodramus savannarum	Grasshopper Sparrow	PS		S3B,S3N
Limnothlypis swainsonii	Swainson's Warbler			S2S3B
Oenothera triloba	Stemless Evening-primrose			S1
Pandion haliaetus	Osprey			S3
Passerina ciris	Painted Bunting			S3B
Penstemon tenuiflorus	White-flower Beardtongue			S3
Schlotheimia rugifolia	Rugged-leaf Schlotheimia Moss			S3S4
Thryomanes bewickii	Bewick's Wren		LE	S1

Notes
PS = Partial Status
LE = Listed Endangered

Attachment B – Addendum Report: Phase I Cultural Resource Survey of 92 Acres Optimist Solar Farm, Clay County, Mississippi

Addendum Report:
Phase I Cultural Resource Survey of 92 Acres Optimist Solar Farm

Clay County, Mississippi
PO #1197515, Addendum

New South Associates, Inc.