

Muscle Shoals Reservation Wetland Report

March 2012

Introduction

In November 2011 the Tennessee Valley Authority (TVA) completed an Environmental Impact Statement (EIS) on the sale and transfer of 1400 acres of TVA land on the Muscle Shoals Reservation (MSR). TVA is working with the Muscle Shoals area community to develop a comprehensive master plan that would guide the redevelopment of the property.

To get a better perspective on the type, location, and size of wetlands on the MSR, TVA conducted a wetland survey of the site during February 2012. This assessment was conducted for use in guiding development plans that comply with federal regulations concerning wetlands as set forth under the Clean Water Act (CWA) and Executive Order (EO) 11990 (Protection of Wetlands). An assessment of the type, location, and size of wetlands on the MSR will ensure that improvements or facilities proposed to be constructed on any part of the property will be sited to avoid or minimize adverse impacts on wetlands.

This report describes and documents the methods, results and conclusions of the wetland delineation conducted for this project.

Project Area

The project is a 1400-acre site located in Muscle Shoals, Alabama, in Colbert County. Land uses in the area include agriculture (hay/pasture), developed areas (office/warehouses/solid waste disposal units), forests, ponds, and wetlands. Pond Creek flows throughout the eastern side of the site, consequently a portion of the site lies within the floodplain of Pond Creek.

As described in the EIS, National Wetland Inventory (NWI) maps indicate approximately 200 acres of the MSR is wetland (Figure 1). NWI maps for this area were prepared in 1981 and 1982 through photo interpretation of color infrared photography at a scale of 1:58,000 acquired by the National High Altitude Photography Program. Wetlands were classified according to the U.S. Fish & Wildlife Service definition of wetlands:

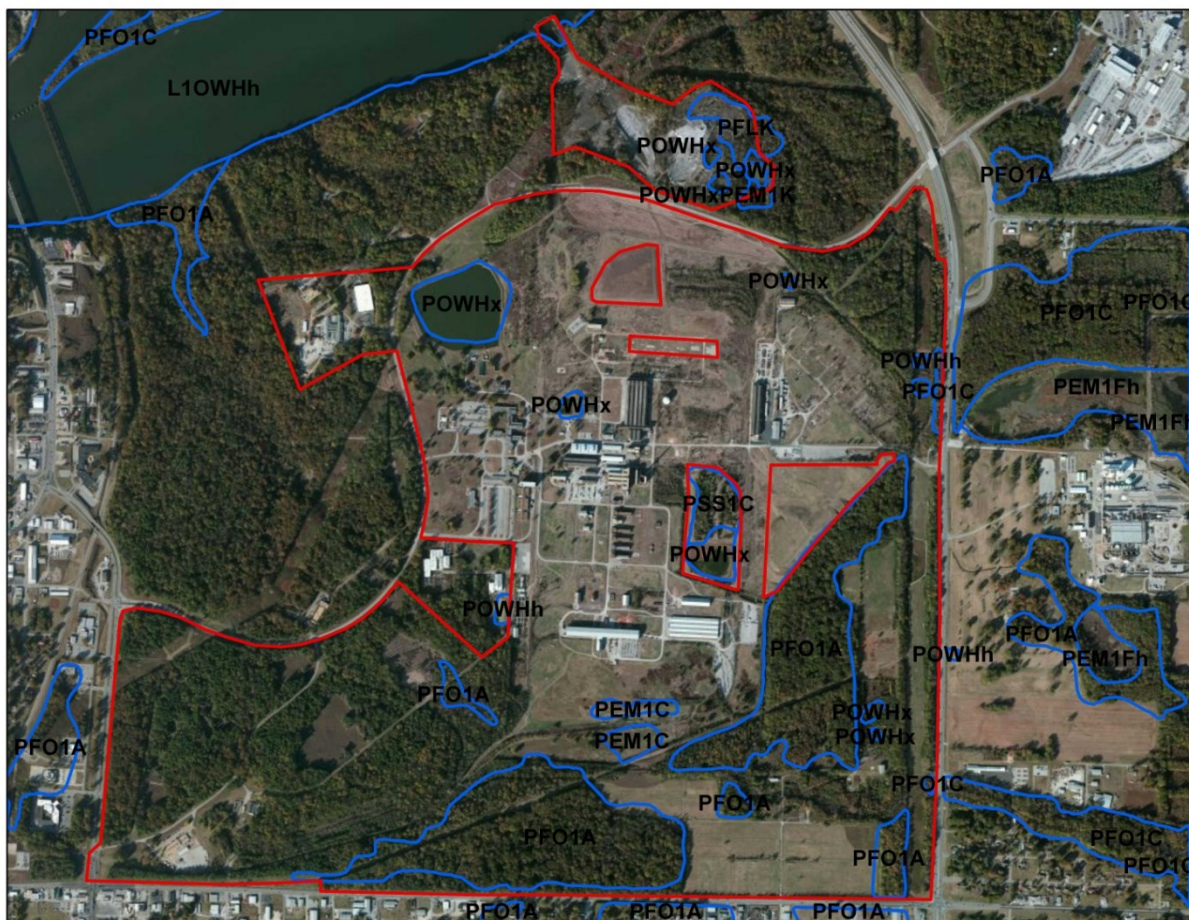
"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water... wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. "

-----Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979)

As shown in Figure 1 the majority of NWI wetlands mapped on the MSR are classified as palustrine forested, broad-leaved deciduous, temporarily flooded. This classification is primarily used to describe bottomland hardwood habitat associated with major rivers and streams. There are also areas of palustrine emergent wetlands mapped on the MSR. Both of these areas are characterized by prolonged flooding and water tolerant plant species.

While NWI data is useful for general planning purposes, there are limitations associated with the maps. Maps were prepared through photo interpretation with limited field checking; as a consequence, wetland boundaries are approximate. The aerial photography often did not pick

Figure 1 - National Wetland Inventory Wetlands - MSR



up smaller wetlands or wetlands at the drier end of the spectrum. Conversely, NWI data can also overestimate the areal extent of wetlands. In addition, the data is 30 years old, and changes in wetland type and extent can occur during that time.

Regulatory Basis

As a federal agency, TVA must adhere to federal guidelines for wetland protection, thus wetlands on the MSR were identified to reflect requirements of two main federal regulations: (1) Section 404 of the Clean Water Act (CWA), and (2) EO 11990. Discharges of dredged or fill material into waters of the United States, including wetlands, are regulated under Section 404 of the CWA. Any such action proposed in wetlands or other waters of the U.S. are subject to review by the U.S. Army Corps of Engineers (USACE) and in Alabama, the Alabama Department of Environmental Management (ADEM).

For jurisdictional purposes, USACE define wetlands as follows:

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (Environmental Laboratory 1987, USACE 2010)

USACE uses three characteristics of wetlands when making wetland determinations: vegetation, soil, and hydrology. Hydrophytic vegetation includes plants that are adapted to life in soil that is at least periodically saturated. Soils that may occur in wetlands (hydric soils), have characteristics that indicate they were developed in conditions where soil oxygen is limited by the presence of saturated soil for long periods during the growing season. Wetland hydrology refers to the presence of water at or near the soil surface for a sufficient period of the year to significantly influence the plant types and soils that occur in the area. One or more indicators of hydrophytic vegetation, hydrology, and hydric soils must be present for an area to meet the definition of a jurisdictional wetland.

EO 11990 requires TVA and other federal agencies to evaluate the likely impacts of actions in wetlands. The objective of E.O. 11990 is to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetland and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Specific to the MSR land disposition, Section 4 of the EO states ***"When Federally-owned wetlands or portions of wetlands are proposed for loan, easement, right-of-way or disposal to non-Federal public or private parties, the Federal agency shall (a) reference in the conveyance those uses that are restricted under identified Federal, State, or local wetlands regulations; and (b) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successor Except where prohibited by law; or (c) withhold such properties from disposal."***

Methodology

Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (i.e., wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Reed 1997; U.S. Department of Defense and USEPA 2003; USACE 2010). Broader definitions of wetlands, such as that used by the U.S. Fish and Wildlife Service (USFWS) (Cowardin et al. 1979), and the TVA Environmental Review Procedures definition (TVA 1983), were also considered in this review. Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (Tennessee Valley Authority Rapid Assessment Method [TVARAM]), wetlands were categorized by their functions, sensitivity to disturbance, rarity, and ability to be replaced. The categorization can be used to evaluate impacts and to determine the appropriate levels of mitigation for wetland impacts.

Prior to fieldwork, existing NWI data and soils data were compiled and mapped, and overlain with numbered north-south transects approximately 100 feet apart. The entire site was surveyed using these transects as a guide to ensure coverage of the entire site. Wetland boundaries were mapped in the field using Trimble XP GPS units. Data were then post-processed using Trimble ArcAnalyst to obtain sub-meter accuracy and mapped via ArcGIS software. Boundaries of jurisdictional wetlands were flagged in the field. NWI mapped wetlands were not.

Field investigations were conducted on February 6-9, 2012, by TVA staff and contract wetland biologists. A routine small-area method was utilized to identify the location of wetland boundaries. An assessment of USACE hydric indicators (soils, hydrology, and vegetation) was conducted at representative locations within the project area. The indicator status of plants identified at the site was determined using the *National List of Plant Species That Occur in Wetlands* for Region 2 (Reed 1988). Soil pits were dug to a depth of approximately 46 centimeters (18 inches) to evaluate indicators of wetland soils and hydrology. Parameters evaluated included soil color, texture, saturation, and other indicators of inundation. Soil colors were determined using the *Munsell Soil Color Chart* (Munsell 1998). Indications of wetland hydrology including but not limited presence of standing water, drainage patterns, drift deposits, etc. were measured and/or noted. Sample points that exhibited all three qualifying wetland characteristics (vegetation, hydrology, and soils) were identified as wetlands.

Wetlands were identified as: (1) jurisdictional wetlands, which meet the federal regulatory definition of wetlands under Section 404 of the CWA, and (2), the broader, habitat-based definition of wetlands as defined in EO 11990. Jurisdictional wetlands -- those that are regulated by the USACE under Section 404 -- must exhibit all three characteristics: hydrology, hydrophytes, and hydric soils (Environmental Laboratory 1987, USACE 2010). Some areas, however, function as wetlands ecologically, but exhibit only one or two of the three characteristics. In the case of the MSR, portions of the NWI-mapped wetlands do not have hydric soils throughout the entire wetland area and thus do not currently qualify as USACE jurisdictional wetlands. These areas do, however, meet the definition of wetlands as mandated by EO 11990. Therefore any impacts to NWI mapped wetland area outside the USACE jurisdictional delineated wetland boundary would be fall under the mandates of EO11990. If impacts are proposed to these NWI wetland areas, an environmental assessment would be required to assure compliance with the order.

Results

Nineteen jurisdictional wetlands were mapped that meet the USACE regulatory wetland definition (Table 1). In most cases these jurisdictional wetlands are located within larger wetland habitats that are mapped on NWI maps. Throughout the MSR, land use history, and drainage alterations have altered the historic type, extent, and distribution of wetlands. In general, however, wetlands are associated with the floodplain of Pond Creek, and lower-lying areas where the water table is near the surface during the spring rainy season and/or where ponding of surface water occurs after heavy or extended rain.

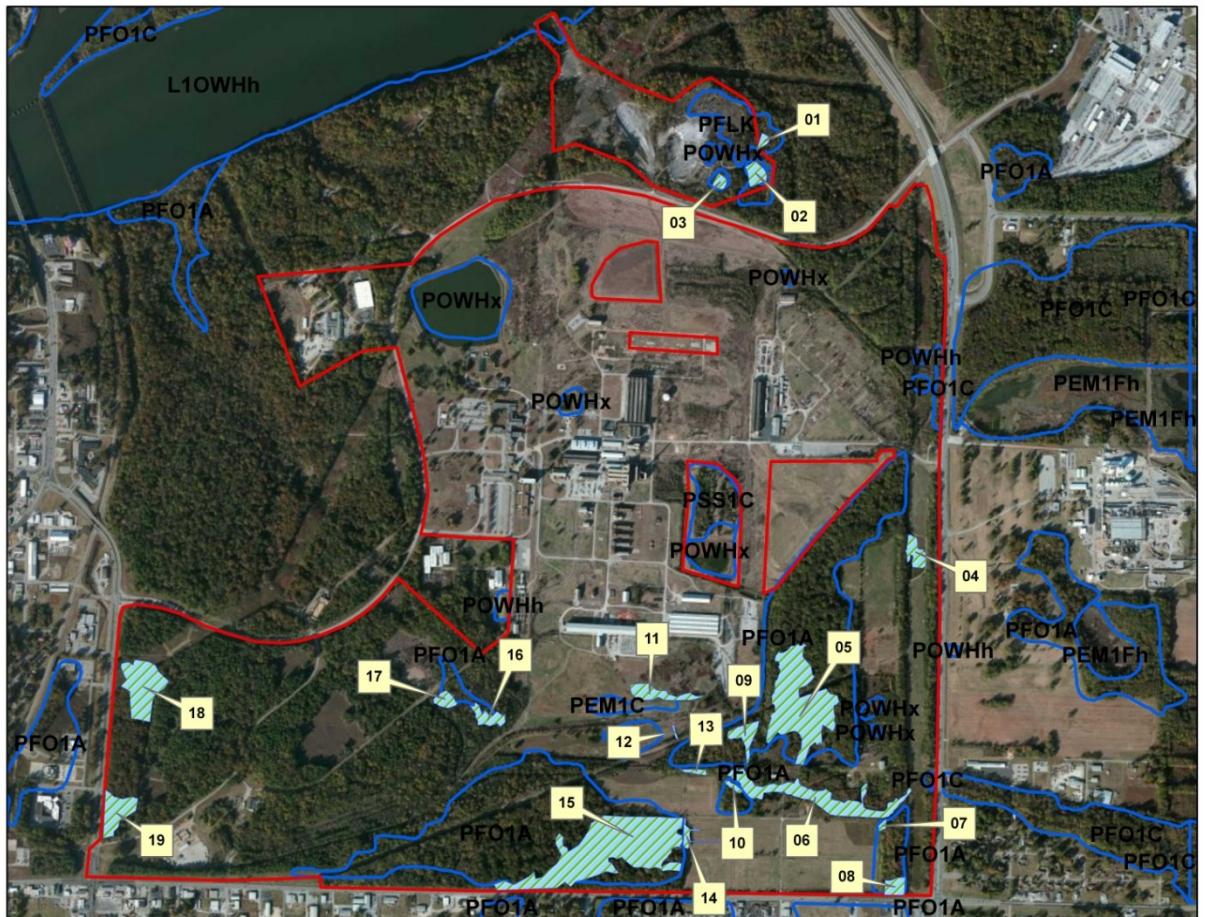
Figure 2 indicates the location of mapped wetlands. Figure 3 superimposes the location of mapped/surveyed wetlands over NWI wetlands.

Table 1 - Wetlands - Muscle Shoals Reservation

Wetland Identifier	Wetland Type¹	Wetland Acreage	TVA RAM Category	Field Notes	NWI Wetland & Total Acreage
MSR-01	PFO1A	0.33	2 (53)	Forested seepage	Not shown on NWI
MSR-02	PUBHx	1.09	2 (59)	Mining excavation	Not shown on NWI
MSR-03	PUBHx	0.44	2 (43)	Mining excavation	Not shown on NWI
MSR-04	PEM1C	1.32	2 (40)	Emergent wetland in ROW	Not shown on NWI
MSR-05	PFO1A	13.37	3 (83)	Mature forested wetland	PFO1A - 75.54
MSR-06	PEM1E	6.95	3 (73)	Forested floodplain of Pond Creek	Not shown on NWI
MSR-07	PFO1A	0.18	3 (60)	Depression	PFO1A - 7.33
MSR-08	PFO1A	1.0	3 (60)	Forested	PFO1A - 7.33
MSR-09	PFO1A	1.48	3 (71)	Forested floodplain of Pond Creek	PFO1A - 75.54
MSR-10	PFO1A	0.25	3 (65)	Mature forested wetland	PFO1A - 2.56
MSR-11	PFO6F	1.91	2 (37)	Drainage in open field with trees < 15 in. dbh	PEM1C - 3.39
MSR-12	PEM1C	0.07	1 (22)	Drainage in open field	Not shown on NWI
MSR-13	PFO/PEM1E	0.30	3 (64)	Forested	Not shown on NWI
MSR-14	PFO1E	0.52	3 (63)	Mature forested	PFO1A - 84.48
MSR-15	PFO1E	20.05	2 (49)	Forested	PFO1A - 3.26
MSR-16	PFO1E	1.81	2 (51)	Forested	PFO1A - 3.26
MSR-17	PFO1A	0.80	3 (65)	Mature forested	Not shown on NWI
MSR-18	PFO1A	5.45	3 (69)	Mature forested	Not shown on NWI
MSR-19	PFO1A	2.80	2 (52)	Mature forested	
TOTAL		60.12			

¹Classification codes as defined in Cowardin et al. (1979): PFO1A = Palustrine, forested, broadleaf deciduous, seasonally flooded; PUBHx=Palustrine, unconsolidated bottom; permanently flooded, excavated; PEM1C = Palustrine, emergent, persistent vegetation, seasonally flooded; PEM1E = Palustrine, emergent, persistent vegetation, seasonally flooded/saturated; PFO1E = Palustrine, forested, broadleaf deciduous, seasonally flooded/saturated; PFO6F = palustrine, forested, deciduous, semi permanently flooded.

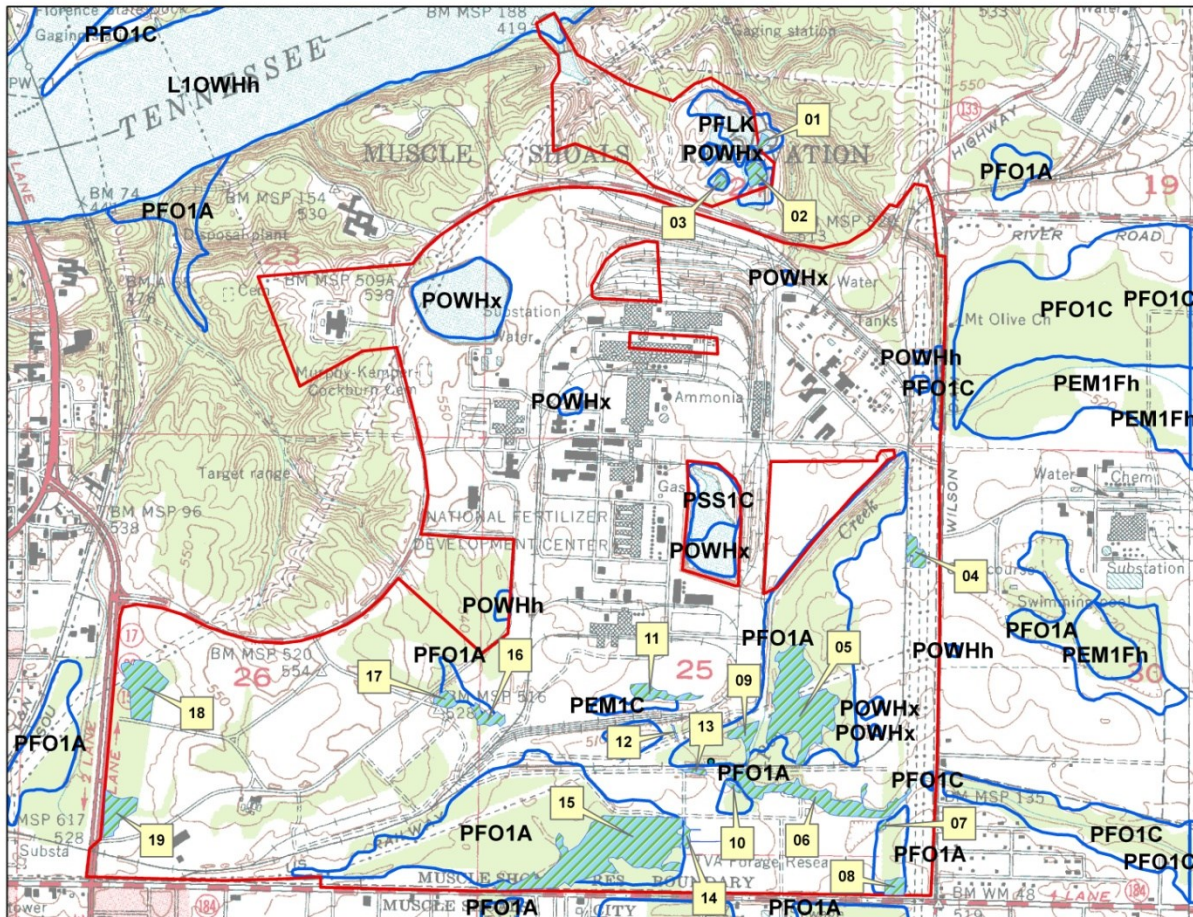
Figure 2 - Surveyed Wetlands - MSR



Conclusion

The wetlands identified on the MSR are primarily associated with the floodplain of Pond Creek and within low lying, poorly drained areas throughout the site. Wetlands should be clearly identified on all property maps and promotional material for the MSR development. In order to assure compliance with EO 11990, TVA would include specific language in the deed, transfer, or other property conveyance documents that describes wetland presence and location and requires any proposal for future land-based improvements or water use facilities in a wetland area be subject to TVA review and approval prior to construction. In the course of these future reviews of specific proposals, TVA would evaluate the potential impacts to the wetland(s) resulting from such proposals, including those outside the floodplain, and assure compliance with EO 11990 and its requirement for a “no practicable alternative” determination and minimization of impacts.

Figure 3 - NWI & Field Surveyed Wetlands - MSR



If impacts, including discharge of dredge or fill material into jurisdictional waters (including wetlands) are proposed, a permit should be obtained from the USACE. If proposed impacts are less than 0.5 acre, authorization under a Nationwide Permit (NWP) would likely apply. If impacts are greater than 0.5 acre, an individual 404 permit would be necessary. State 401 water quality certification and appropriate soil erosion and sediment controls may apply regardless of direct wetland impacts. Any impacts greater than 0.1 acre would require compensatory wetland mitigation.

Literature Cited

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetland and Deepwater Habitats of the United States*. Washington, D.C.: U.S. Fish and Wildlife Publication FWS/OBS-79/31.
- Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Vicksburg, Miss.: U.S. Army Corps of Engineers Waterways Experiment Station. Technical Report Y-87-1

- Mack, J. 2001. *Ohio Rapid Assessment Method for Wetlands*, Version 5.0, User's Manual and Scoring Forms. Columbus: Ohio Environmental Protection Agency, Division of Surface Water, 401/Wetland Ecology Unit, EPA Technical Report WET/2001-1.
- Muncy, J. A. 1999. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (revised edition). Edited by C. Austin, C. Brewster, A. Lewis, K. Smithson, T. Broyles, T. Wojtalik. Norris: Tennessee Valley Authority Technical Note TVA/LR/NRM 92/1.
- Munsell Color Book. 1998. Munsell Soil Color Charts. GretagMacbeth, New Windsor, New York.
- Reed, P. B. 1988. *Revised National List of Plant Species that Occur in Wetlands: National Summary*. U.S. Fish and Wildlife Service Biological Report 88(24).
- Strand, M. N. 1997. *Wetlands Deskbook*, 2nd Edition. Washington, D.C.: The Environmental Law Reporter, Environmental Law Institute.
- Tennessee Valley Authority. 1983. *Procedures for Compliance with the National Environmental Policy Act: Instruction IX Environmental Review*. Tennessee Valley Authority. Retrieved from <http://www.tva.gov/environment/reports/pdf/tvanepa_procedures.pdf> (n.d.)
- U.S. Army Corps of Engineers. 2010. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*, ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble, and J.F. Berkowitz. ERDC/EL TR-10-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U. S. Department of Defense and U.S. Environmental Protection Agency. "Advance Notice of Proposed Rulemaking on the Clean Water Act Regulatory Definition of Waters of the United States." *Federal Register*, Volume 68(10), January 15, 2003.