

NATURAL RESOURCE ASSESSMENT FOR THE PROPOSED ENVIRONMENTAL MANAGEMENT DISPOSAL FACILITY (EMDF), OAK RIDGE, TENNESSEE



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Environmental Sciences Division

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ACRONYMS

ACOE	Army Corps of Engineers
BCK	Bear Creek
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
OBL	Obligate Wetland
ORR	Oak Ridge Reservation
PHK	Pinhook Branch
TDEC	Tennessee Department of Environment and Conservation
UPL	Upland

1. INTRODUCTION

A major contributor to the success of decommissioning, demolition, and remediation activities at the East Tennessee Technology Park by the U.S. Department of Energy (DOE) Oak Ridge Office of Environmental Management (OREM) has been the availability of an onsite Low-Level Waste (LLW) landfill. However, the existing LLW landfill is near capacity, with cleanup of excess facilities at the Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) pending. Timely provision of additional disposal capacity on the Oak Ridge Reservation (ORR) is required to remedy the threats to human health and the environment.

A new landfill, named the Environmental Management Disposal Facility (EMDF), is proposed for central Bear Creek Valley. This location has the advantages of not requiring aggressive groundwater controls, being near to the Y-12 and ORNL facilities where the waste will be generated, being sufficiently separated from other facilities in Bear Creek Valley to avoid conflicts during construction and operations, and being over some of the most favorable geologic formations on the ORR from a landfill siting perspective. Development of EMDF may impact approximately 140 acres in central Bear Creek Valley.

Oak Ridge National Laboratory environmental sciences and natural resources staffs were contracted in March 2018 to conduct a natural resource assessment of a proposed area for construction of the EMDF. The primary objective of the assessment is to identify anticipated environmental impacts from facility construction to inform facility planning and construction decision-making. Further the environmental surveys will help ensure that Applicable or Relevant and Appropriate Requirements (ARARs) relative to natural resources are identified and addressed. Where there are unavoidable losses to natural resources, survey information will inform the potential level of mitigation that might be required. Natural resource surveys started in April 2018 and continued into early June 2018. Surveys included assessments of potential impacts to ecological communities such as wetlands, streams, and timber resources. Surveys also consider potential impacts to rare species, including state and federally protected species (T&E species) and species of conservation concern to the ORR (including birds, amphibians, mammals, and plants). Specific regulatory requirements and agency consultations are often required when rare species, for example many increasingly-rare bat species, are potentially impacted by development.

The natural resources information described herein provides information of value in addressing or mitigating many natural resource-related ARARs including:

- 1) the typical requirements of the aquatic resource alteration regulations [Tennessee Code Annotated (TCA) 69-3-108(b)(1)(j)], as detailed in TDEC's Aquatic Resource Alteration Permits (ARAPs),
- 2) the substantive requirements detailed in the Clean Water Act of 1972 (CWA), as amended, Section 404 for the protection of aquatic resources including wetlands where the action involves discharges of dredged or fill material into aquatic ecosystems,
- 3) evaluation of the presence of floodplains and consideration of alternatives (10 CFR 1022)
- 4) waters of the state including wet-weather conveyances as defined in TCA 69-3-103(33 and 42).
- 5) presence and protection of migratory birds and their habitat (16 U.S.C. 703-712; Executive Order 13186), and
- 6) presence of nongame species and plants that are endangered, threatened, or rare (addressing multiple regulations at the federal and state level).

Specific ARARs that cover the EMDF project are provided in the project record for the RI/FS (UCOR staff, personal communication).

2. SURVEY APPROACH

The approach taken to natural resource assessment of the area potentially suitable for the EMDF is similar to the approach taken at other sites across the Oak Ridge Reservation (ORR), including sites in Bear Creek Valley (e.g., the ETTP Haul Road, and the UPF Haul Road). By using a similar survey approach the EMDF survey results can be easily compared to the findings elsewhere in the watershed. The natural resource assessment incorporates previous survey data in the area obtained by the ORR Natural Resources Program and the Biological Monitoring and Abatement Program (BMAP).

Because of the large size of the site, the natural resource team conducted walkovers of the study area to identify specific zones for follow-up evaluation (Figure 1). Specific survey methods for wetland delineations, stream surveys, timber assessments, and rare species surveys are described in the subsections below.

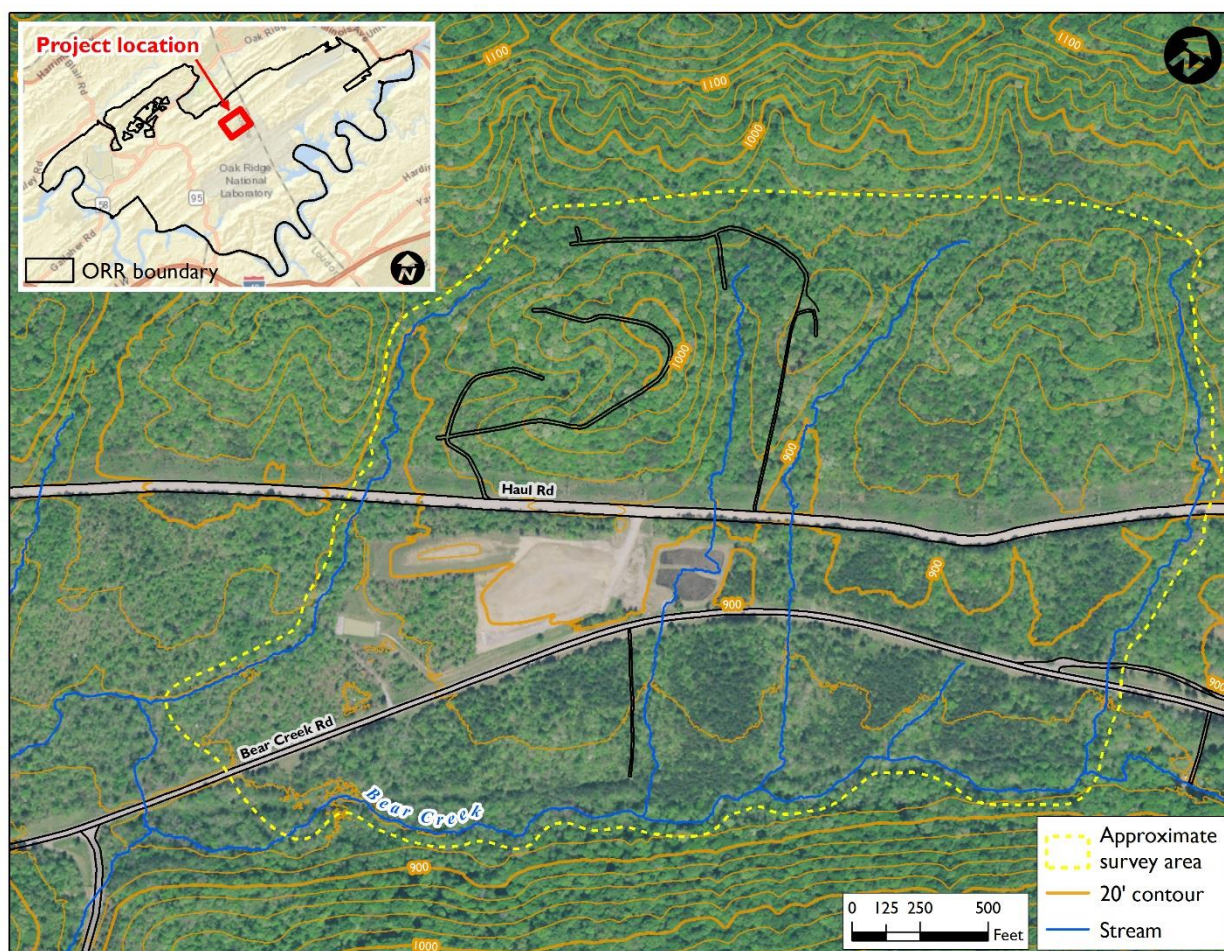


Figure 1. Map showing the proposed EMDF project area with the boundaries of the area to be surveyed for natural resources in yellow.

2.1 WETLAND DELINEATIONS

Potential wetlands within the EMDF study area were evaluated relative to the dominance of wetland vegetation, soils, and hydrological characteristics per Army Corps of Engineers (ACOE) wetland delineation protocols (ACOE 1987). The wetland vegetation criterion is met if more than 50% of the dominant species within each stratum are hydrophytic. To make this determination, plant species are assigned an indicator status as follows.

- *Obligate Wetland* (OBL). Occurs almost always (estimated probability >99%) under natural conditions in wetlands.
- *Facultative Wetland* (FACW). Usually occurs in wetlands (estimated probability 67-99%) but occasionally found in nonwetlands.
- *Facultative* (FAC). Equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%).
- *Facultative Upland* (FACU). Usually occurs in nonwetlands (estimated probability 67-99%) but occasionally found in wetlands (estimated probability 1-33%).
- *Obligate Upland* (UPL). Occurs in wetlands in another region but occurs almost always (estimated probability >99%) under natural conditions in nonwetlands in the region specified.

For classifying an area as hydrophytic, vegetation species codes based on the previous definitions are OBL, FACW, and FAC. Plants are identified to the nearest most likely taxon (the absence of flowering parts or other key indicators at times make positive identification difficult). Soils were examined for evidence of wetland development, including examination of soil color, texture, and the presence of mottles, manganese concretions, high organic content, and other indicators of hydric-soil status. Potential wetland sites were also examined for primary and secondary indicators of wetland hydrology. The presence of watermarks, drift lines, oxidized root channels, water-stained leaves, and other indicators of wetland hydrology were noted.

Wetland boundaries were marked using flagging tape and GPS points taken for mapping and determination of total acreage.

2.2 STREAM SURVEYS

Several streams are located within the study area of the proposed EMDF site. These streams have been impacted previously by other construction activities including road construction and wetland creations, which can isolate sections of streams from downstream aquatic fauna, primarily fish. The Bear Creek watershed is home to a strong population of Tennessee dace (*Chrosomus tennesseensis*) – a small stream fish species which migrates upstream during spring spawning seasons. This is the only fish on the Oak Ridge Reservation listed as In Need of Management by TWRA.

To determine the presence and potential impacts to aquatic fauna, streams were identified and mapped using GIS software to illustrate key features, stream lengths and floodplain locations based off elevation. In addition, sampling was conducted in each suitable stream reach to determine presence/absence of fish species.

A hydrologic determination (following the TDEC protocol) was done previously for the D-10W stream. Additional hydrologic determinations were conducted on other drainages located within the EMDF study area.

2.3 TIMBER ASSESSMENT

A timber assessment was conducted to evaluate timber locations, timber quality, and ease of equipment access. Site hazards and detections of ground evidence of historic or cultural assets within the general harvest area were noted and physically flagged for later assessment by others and for avoidance during the timber salvage operations. Any applications of the Guide to Forestry Best Management Practices in Tennessee were also identified. Assessment of wildfire risk and the extent of residual vegetative debris was also prepared.

Like all projects that remove timber on the reservation, removal of merchantable timber on this site would need to follow ORR guidance which includes using an established DOE timber salvage contractor at no cost to the project. After deduction of any access improvement costs, the contractor will need to remit to DOE funds representing the stumpage sold from the project site. The timber harvest operation would need to be well planned in advance following the timber assessment and based on project needs. Anticipated logging traffic will need to be planned and coordinated with other organizations using the existing roads in the area.

2.4 RARE SPECIES SURVEYS

The Endangered Species Act (ESA, 1973) requires that federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS), ensure that actions they authorize, fund, or carry out do not threaten the existence of any plant or animal species listed as threatened or endangered. Additionally, actions of these agencies cannot result in destruction of habitat critical to the survival of these listed species. The Tennessee Wildlife Resources Agency (TWRA) has also adopted by reference the species and subspecies protected under the federal ESA. TWRA also maintains its own list of endangered, threatened, and “in need of management” species.

Sixteen survey points were established approximately 200 meters apart across the site (Figure 2). Coordinates for each point are provided on Appendix A. At these survey points information on birds, small terrestrial mammals, reptiles and amphibians were recorded. All birds seen or heard at each point were recorded using methods established under the international Partners In Flight program, similar to breeding surveys already conducted on the ORR. Birds seen or heard while traveling between survey points and those incidentally observed in the course of surveying other resources on the site were also recorded. Also conducted were site listening surveys to capture information on nocturnal species (e.g., owls). Three Sherman live-traps were set in strategic locations at each point to gather information on small mammal populations frequenting the area. Visual encounter surveys (VES) were also conducted at each point to gain information on reptiles and amphibians. Cover board sampling and direct searches under logs, rocks, bark, leaf litter, and other debris were also performed. Drainages and wetlands on the site were surveyed for presence of amphibian species, including evening anuran (frog) call surveys.

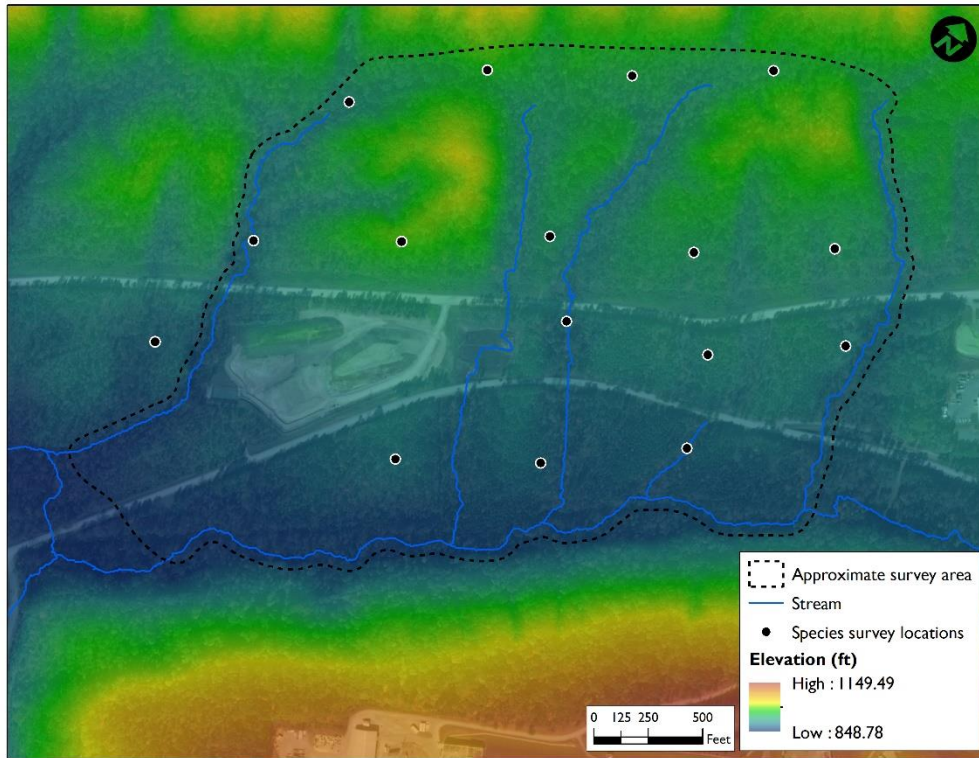


Figure 2. Map of rare species survey points.

Much of the proposed EMDF landfill, support facilities and planned alterations to Bear Creek Road and the Haul Road consists of open forest suitable for bat flyways and foraging grounds, with many suitable bat roost trees available. Passive acoustic surveys were done for seven successive nights beginning July 31, 2017 to determine presence of all listed bat species within the planned EMDF landfill area. Additional acoustic surveys were done for 23 successive nights, beginning May 2, 2018 to cover the planned EMDF area. Continuous monitoring during bat spring emergence from hibernation, travel to summer roost sites, and into the summer roost season provides information on seasonal use of the area by listed bat species. Acoustic survey equipment consists of Wildlife Acoustics SM4Bat FS song meter with SMM-U1 or SMM-U2 ultrasonic microphone. Kaleidoscope Pro Analysis Software, version 4.0.0 was used to analyze data in zero-crossing and full spectrum mode. The zero-crossing mode of analysis is accepted by the USFWS for bat acoustic analysis, and the full-spectrum mode was used to corroborate results and enhance manual vetting of calls by a trained technician. Survey sites were selected based on presence of potential roost trees, live or dead, with peeling bark and/or snags with crevices. Other site criteria include suitable foraging areas, such as open hardwood or hardwood/pine forest, wetlands, and flight corridors along forested roads and streams.

3. SURVEY RESULTS

3.1 WETLAND DELINEATIONS

Seventeen wetlands are located within or partially within the study area (Figure 3). A total of 11.81 acres of wetland were surveyed (Table 1). Wetlands are named based on their associated tributary or creek. Detailed information about hydrology, vegetation and soil for each wetland can be found on the data forms in Appendix B. GPS coordinates for each wetland can be found in Appendix C.

3.1.1 WETLANDS ALONG NORTH TRIBUTARY 9 (NT9)

Four wetlands are located along North Tributary 9 (NT9). From north to south these are named NT9-A, NT9-B, NT9-C, NT9-D.

Wetland NT9-A

Wetland NT9-A is a 0.92 acre wetland. The wetland is located north of the Haul Road along the two forks of NT9. It forms a long narrow wetland along the western fork, but a small finger extends following a short segment of the eastern fork. The wet hydrology comes from a seasonally high groundwater table and periodic overbanking of the tributary. In general, the wetland is narrowest when the tributary is incised, and widest when the tributary flows underground or is closer to the surface. The wetland is widest near the Haul Road where the tributary channel is least defined. The majority of the wetland is a palustrine forested community that is more or less confined to the ravine through which the tributary flows. A palustrine emergent community occurs at the southern tip and the eastern finger of the wetland, both of which reside within the powerline corridor.

Wetland NT9-B

Wetland NT9-B is a 0.41 acre wetland and is located north of Bear Creek Road. It forms along the east side of NT9 within multiple surface depressions and drainage patterns. Its wet hydrology comes from a seasonably high ground water table and water flow over the ground surface.

Wetland NT9-C

Wetland NT9-C is a 0.28 acre wetland. It is located on the south side of Bear Creek Road and the east side of the wetland abuts NT9. Its wet hydrology comes from a seasonably high ground water table, periodic overbanking of NT9, and drainage from Bear Creek Road and the surrounding forest. The wetland is a palustrine forested community with a dense shrub layer.

Wetland NT9-D

Wetland NT9-C is a 0.20 acre wetland located along the tributary approximately 35 feet south of NT9-C. The wetland begins along the southernmost portion of NT9 before the tributary empties into Bear Creek. The wetland then curves to follow the riparian zone of Bear Creek. This close proximity to Bear Creek and a major tributary, along with the convergence of multiple wet weather conveyances, has led to the wet hydrology in this area. The wetland is a palustrine forested community.

3.1.2 WETLAND ALONG UNNAMED TRIBUTARY

Three wetlands occur along a drainage and unnamed tributary of Bear Creek that is located between NT9 and NT10. From north to south these are named UT-A, UT-B, and UT-C. Wetlands UT-A and UT-B are

located along the drainage that eventually becomes a tributary. UT-C is located south of Bear Creek Road along the tributary.

Wetland UT-A

Wetland UT-A is a 0.66 acre wetland located north of the Haul Road between NT9 and NT10. The wet hydrology comes from a seasonally high groundwater table as well as drainage from the Haul Road and the surrounding forest. There are multiple inundated areas, but minimal evidence of any drainage or tributary channel within the wetland. The southern wetland boundary has a dense pocket of shrubs that abuts the Haul Road.

Wetland UT-B

Wetland UT-B is a 0.10 acre wetland located just south of the Haul Road. The wet hydrology comes from a seasonally high groundwater table along with drainage from the Haul Road and the surrounding forest. Unlike UT-A, the wetland forms along a defined drainage channel.

Wetland UT-C

Wetland UT-C is a 0.10 acre wetland located south of Bear Creek Road along the Unnamed Tributary. The wetland begins along the sparsely vegetated channel before spreading out to include low laying areas dominated by herbaceous vegetation. One wetland occurs along an unnamed tributary of Bear Creek.

3.1.3 WETLANDS ALONG NORTH TRIBUTARY 10 (NT-10)

Three wetlands are located along North Tributary 10 (NT10). From north to south these are named NT10-A, NT10-B, and NT10-C.

Wetland NT10-A

Wetland NT10-A is a 0.19 acre wetland located along NT10 near the northern edge of the study area. The wetland has formed in a concave surface near the tributary. The lowest lying areas were inundated with sparse vegetation at the time of survey. The other portion of the wetland had saturated soils. It is located within a forest community, although the wetland itself had little woody vegetation.

Wetland NT10-B

Wetland NT10-B is a 0.63 acre wetland located north of the Haul Road. It is separated from NT10-A by approximately 650 feet of NT10 that is deeply incised. The wet hydrology comes from a seasonally high groundwater table and periodic overbanking of the tributary. The majority of the wetland is a palustrine forested community that is confined to the ravine through which the tributary flows. A palustrine emergent community occurs at the southern portion of the wetland that lies within the powerline corridor adjacent to the Haul Road.

Wetland NT10-C

Wetland NT10-C is a 0.68 acre forested wetland south of Bear Creek Road. The wetland begins along the southernmost portion of NT10 before the tributary empties into Bear Creek. This is the wettest portion of the wetland. The wetland then spreads out east and west along the riparian zone of Bear Creek. Drainage patterns and varying degrees of soil moisture have created a wetland with varying wetland characteristics.

3.1.4 WETLANDS ALONG DRAINAGE 10 WEST (D10W)

Three wetlands are located along Drainage 10 West (D10W). Although originally named as a drainage, D10W is a tributary. From north to south these are named D10W-A, D10W-B, and UPF Wetland 11. Wetlands D10W-A and D10W-B are naturally occurring wetlands along the tributary. UPF Wetland 11 is created wetland used for mitigation of the UPF Haul Road.

Wetland D10W-A

Wetland D10W-A is a 0.14 acre wetland. It is palustrine forested community located at the northern side of the study area. Its wet hydrology comes from D10W, and it widens as it reaches a gravel well access road. It is disconnected from D10W-B by this gravel road, but these two wetlands may have been connected in the past.

Wetland D10W-B

Wetland D10W-B is a 0.78 acre wetland. It is located north of the Haul Road and forms a long narrow wetland along D10W. The wet hydrology comes from a seasonally high groundwater table and periodic overbanking of the tributary. The majority of the wetland is a palustrine forested community that is more or less confined to the ravine through which the tributary flows. A palustrine emergent community occurs within the powerline corridor at the southern end of the wetland. Similar to the other wetlands that abut the Haul Road, the southern portion of the wetland is wide and wetter than much of the reach. However, unlike the others, the widest portion of D10W-B is in the forested community approximately 200 feet from where the wetland begins.

UPF Wetland 11 (UPF W11)

UPF W11 is a man-made wetland created as mitigation for wetland losses during the UPF Haul Road creation. It is in its third year of monitoring required for wetland mitigation. It is located along D10W and is 0.81 acre consisting of two ponded areas bisected by a berm. It is dominated by herbaceous vegetation, with some shrubs along the wetland edge.

3.1.5 WETLANDS ALONG NORTH TRIBUTARY 11

Three wetlands are located along North Tributary 11 (NT11). From north to south these are named NT11-A, NT11-B, and NT11-C.

Wetland NT11-A

Wetland NT11-A is a 0.77 acre wetland. It is located north of the Haul Road and forms one long continuous wetland along NT11. The wet hydrology comes from a seasonally high groundwater table, periodic overbanking of the tributary, and multiple wet weather conveyances that drain into the ravine. As the wetland follows the tributary, it widens and narrows with the changes in water table. The majority of the wetland is a palustrine forested community, with a palustrine emergent community located within the powerline corridor that abuts the Haul Road.

Wetland NT11-B

Wetland NT11-B is a 0.72 acre wetland located along NT11 between the Haul Road and Bear Creek Road. The wetland follows the tributary becoming narrower and wider based on the surrounding topography.

Wetland NT11-C

Wetland NT11-C is a 1.06 acre wetland.. It is located just north of Bear Creek Road on the western edge of the study area. The wetland is bounded by NT11 on the north, by Bear Creek on the east, and by the toe-slope of Bear Creek Road on the south. Its wet hydrology comes from a seasonably high ground water table, close proximately to Bear Creek and a major tributary, and drainage from Bear Creek Road and the surrounding forest. The wetland is a palustrine forested community with a dense shrub layer.

3.1.6 WETLAND ALONG BEAR CREEK

Many wetlands occur along Bear Creek, but only one is solely associated with Bear Creek instead of one of the tributaries.

BCK-A

Wetland BCK-A is a 3.36 acre wetland. The wetland begins where D10W empties into Bear Creek. While this may add to the wet hydrology, it is the multiple beaver dams located along Bear Creek that have created the flooded wetland conditions. Plant communities vary greatly within this wetland. Areas closest to Bear Creek and the beaver dams are inundated. Some of these inundated areas are open water, while the rest has filled in with herbaceous and woody plant species. The northern edge is forested with a dense shrub layer. Multiple drainages in this area add to the wet hydrology. In the west portion, there is sparse emergent vegetation amongst a layer of pine needles from dying pine trees that cannot tolerate the waterlogged soil.

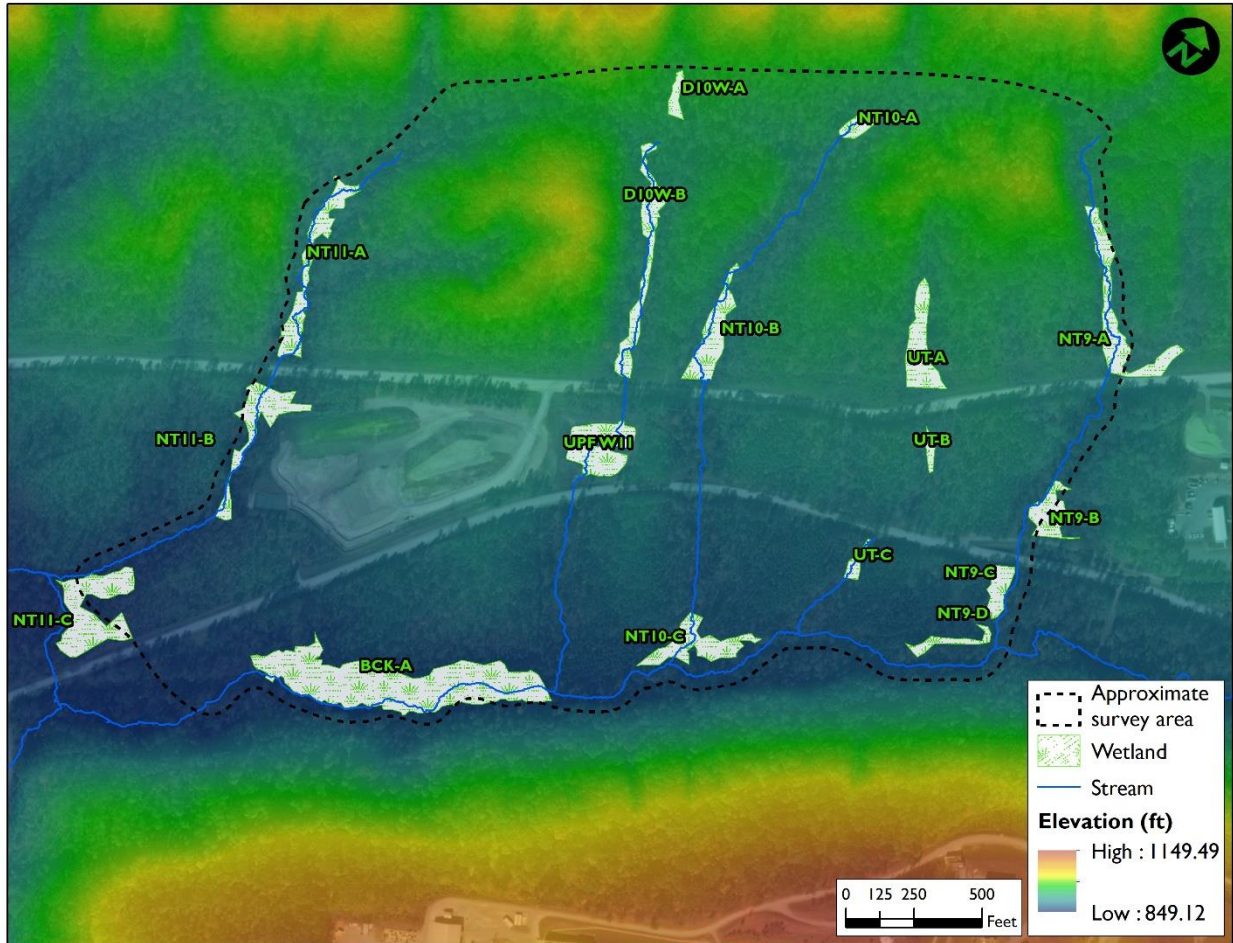


Figure 3. Map of wetlands within and adjacent to the study area.

Table 1. Acres for individual wetlands within and adjacent to the study area.

Wetland	Total Acres
NT9-A	0.92
NT9-B	0.41
NT9-C	0.28
NT9-D	0.20
UT-A	0.66
UT-B	0.10
UT-C	0.10
NT10-A	0.19
NT10-B	0.63
NT10-C	0.68
D10W-A	0.14
D10W-B	0.78
UPF W11	0.81
NT11-A	0.77
NT11-B	0.72
NT11-C	1.06
BCK-A	3.36
Total	11.81

3.2 STREAM SURVEYS

Using biological and hydrologic determinations following the TDEC protocol, water courses within the EMDF study area were surveyed and classified. Formally defined streams within the EMDF study area are shown on Figure 4, comprising 5 separate tributary streams covering 3303 meters of stream. Stream sections with fish are also indicated. Figure 4 also contains shaded regions adjacent to each stream section. These represent elevations less than 5 feet, which would act as floodplains during high water events. Floodplains are an important structure in watersheds and play a key role in the ecology of streams.

Of the five Bear Creek tributary streams located within the proposed EMDF study area all were first or second order streams characterized by low flows during non-rain events, and shallow pools and riffles. Stream substrates were composed of small sized substrate including silt, sand, and gravel. These streams often had losing reaches where a majority or all of the stream flow was below ground for certain sections then reappeared as the topography changed. In addition, there are multiple road crossings on these streams including Bear Creek Road, the Haul Road and some historical roads/culverts across the streams. Many of these road crossings present physical barriers for upstream migration of aquatic fauna, in particular fish, by creating large elevation changes in the stream channel just below culverts. These can present a challenge for even semiaquatic organisms to move upstream to find suitable habitat. In addition, the upstream side of these culverts often creates wetlands with meandering stream channels filled with sediments, not typical of other higher gradient streams found across the ORR.

Fish surveys conducted in these five streams contained fish communities consistent with other areas of the Bear Creek watershed (Table 2). Historical sampling confirms that mainstem sites within Bear Creek

adjacent to the EMDF study site contain a larger diversity of fish species than encountered within the tributaries, indicating the potential for recruitment and seasonal migration by other species in these tributaries. Green sunfish (*Lepomis cyanellus*) were common in both NT11, D10-W and NT9. This species occurs regularly in Bear Creek but the strong population in D10-W was clearly influenced by the abundance of this species occurring in the created wetlands on the north side of Bear Creek Rd (UPF Wetland 11) in this drainage.

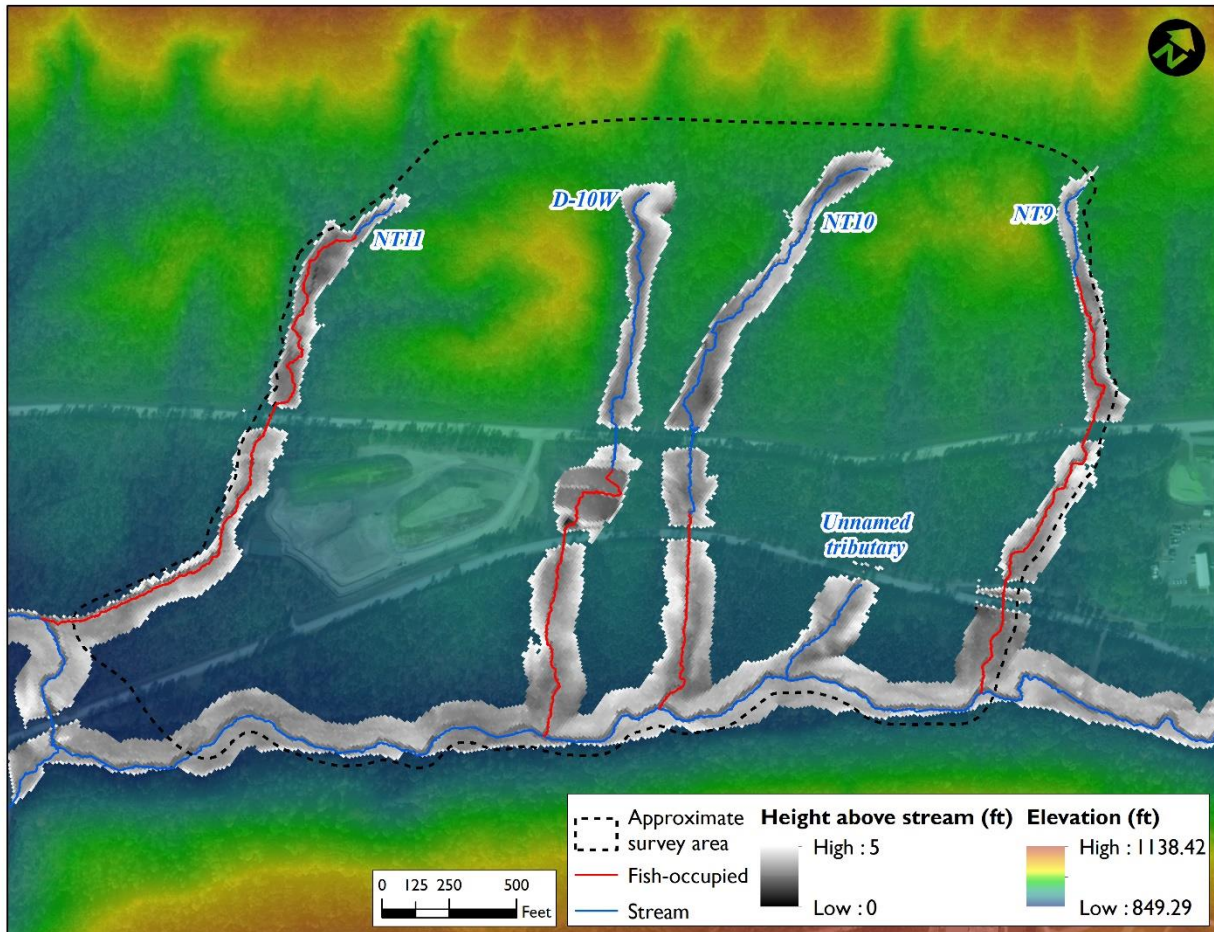


Figure 4. Map of five streams located within the proposed study area of the Environmental Management Disposal Facility. Shaded areas along streams represent elevations < 5 feet as floodplain zones.

3.2.1 STREAM SURVEY SUMMARIES

NT11

Stream fish species were more abundant throughout NT11, which only had one existing road crossing (Haul Road). Species below this crossing were more consistent with those occurring in the main stem of Bear Creek while those above the Haul Road were limited to semi-tolerant headwater species. Of note was the presence of fish very far up in this watershed, which likely indicates sustained flows through most of the year.

D10-W

No fish were encountered in D-10W above the created wetlands. These wetlands and the culvert located just upstream likely act as a barrier to fish passage. A hydrologic determination conducted in late winter

2017 did indicate the presence of multiple populations of obligate lotic organisms within the channel (Appendix D). TDEC protocol for a hydrologic determination (TDEC 2011) identifies this as a primary indicator of a stream, thus even without the presence of fish this section of stream above the Haul Road should still be treated as such. Fish encountered downstream of this point included stream species and an abundance of green sunfish as mentioned above.

Current proposed activities include the rerouting of D-10W beginning somewhere adjacent to the Douglas Chapel Cemetery, towards the east where it will drain into NT10. If this stream were rerouted approximately 0.7 km of stream would be removed from the Bear Creek drainage. TDEC has outlined guidance on mitigation requirements for any activity which impacts waters of the state (TDEC 2004). These protocols have been followed for other project areas within the Bear Creek drainage with success.

NT10

Fish occurrences in NT10 consisted of two semi-tolerant species, and their range was limited to the lower reach of the stream. There is an abandoned road crossing just north of Bear Creek Road with a large culvert which the stream has partially bypassed and adjacent stonework which likely limits upstream migration during high water events. No fish were encountered above this structure, although other aquatic organisms were present throughout.

Unnamed tributary

No fish were observed in the unnamed tributary just east of NT10. A hydrologic determination was completed for this tributary though and it is characterized as a stream based off of geomorphic, hydrologic and biological observations outlined on the TDEC Hydrologic Determination Field Sheet (Appendix D).

NT9

Similar to NT11, the fish community in NT9 contained species consistent with the larger Bear Creek community in the lower reaches and then a more semi-tolerant community occupied the upstream reaches. There were also fish located very far up in the watershed of NT9, indicating sustained flows for most of the year.

Table 2. Table of fish species occurring in five Bear Creek tributaries within the proposed study area of the Environmental Management Disposal Facility and two locations upstream.

Species		Site			
<i>Scientific</i>	Common	NT11	D10-W	NT10	NT9
<i>Rhinichthys atratulus</i>	western blacknose dace	+	+	+	+
<i>Semotilus atromaculatus</i>	creek chub	+	+	+	+
<i>Lepomis cyanellus</i>	green sunfish	+	+	-	+
<i>Etheostoma kennicotti</i>	stripetail darter	+	-	-	-
<i>Etheostoma simoterum</i>	snubnose darter	-	-	-	+

No Tennessee dace, which is a species designated by TDEC as in need of management, were observed in the five streams sampled for this assessment. However, they do occur in Bear Creek and multiple tributaries to Bear Creek both upstream and downstream of the site.

3.3 TIMBER ASSESSMENT

3.3.1 FOREST INVENTORY

Current condition of the EMDF area forest - The current condition of the EMDF Forest can most easily be determined from a recent forest inventory. The portion of the proposed EMDF north of Bear Creek Road was included in a forest inventory conducted in 2015 for Forest Compartment 11, which lies in the geographic center of the ORR. Fieldwork for the compartment inventory was conducted from

September 16, 2014 through May 26, 2015 (4 sample points within an EWM exclusion area were inventoried on August 13, 2015). A subset of the original inventory data composed of those points that fall within the EMDF study area was extracted to prepare the following analysis (Figure 5).

Land use - Land use categories in the proposed EMDF, corresponding to habitat types, include forest, right-of-way, developed areas, edge, and water. Acreage of the land use types is provided in Appendix E, Table E1. Spatial distribution of land use types is shown in Figure 6. Forest comprises approximately 79.0% (127.4 acres) of the area of the proposed EMDF (161.2 acres), followed by right-of-way (13.2%, 21.3 acres). Developed area accounted for 6.6% (10.6 acres), edge 1.1% (1.7 acres) and water <0.1% (0.2 acres). Note – these figures include EMDF areas outside of the 2015 survey, south of Bear Creek Road.

Basal Area - Total basal area of the EMDF forest north of Bear Creek Road is 10,925 sq. ft. Standing dead trees accounted for approximately 4% of the total basal area. The average live basal area of forest is 109 sq. ft. per acre.

A list of species and live tree basal area statistics are provided in Appendix E, Table E2. Thirty-six species were identified; *Fraxinus* (ash) was identified to genus. Trees with a diameter at breast height (dbh, 4.5 feet) ≥ 10.0 inches account for 52.4% of the total basal area. Among trees ≥ 10.0 inches dbh, 4 species contribute $> 5\%$ of forest basal area, including tulip poplar (23.3%), white oak (15.9%), red maple (14.2%), and sweet gum (8.7%). Among sapling-size trees ($2.0 \leq \text{dbh} \leq 10.0$ inches), species ranking based on basal area representing $> 5\%$ includes 6 species: red maple (15.3%), sweet gum (13.9%), loblolly pine (13.5%), tulip poplar (10.7%), sourwood (8.2%) and dogwood (6.0%).

At the genus level, oaks account for 21.3% of the live basal area of trees ≥ 10.0 inches dbh (Appendix E, Table E3), but provide only 5.7% of the sapling size class basal area. White oaks (includes white, post, chinquapin, and chestnut oaks) provide 15.1% of the live basal area of trees ≥ 10.0 inches dbh, but only represent 3.65% of the sapling size class basal area. Red oaks (includes northern red, southern red, scarlet, black, and Shumard oaks) provide 6.25% of the live basal area of trees ≥ 10.0 inches dbh, but only represent 2.1% of the sapling size class basal area. Hickories account for 2.3% of the live basal area of trees ≥ 10.0 inches dbh and 1.6% of live basal area of trees < 10 inches dbh.

Tree Number and Density - Number of trees and saplings in the EMDF forest north of Bear Creek Road forest total 48,836, averaging 508 stems per acre of trees > 2.0 inches dbh (Appendix E, Table E4). There are 48.1 trees > 9.9 inches dbh per acre on average across all forested sample points in the area, totaling 4,624 trees. There are an average of 460 sapling trees (< 10.0 inches dbh) per acre in this forest, totaling 44,212 saplings. For trees ≥ 10.0 inches dbh, tulip poplar (10.7) provides the greatest average number of stems per acre, followed by, red maple (8.5), sweet gum (5.6), and white oak (5.5). Among sapling-size trees, species ranking for average number of stems per acre include sweet gum (73.0), dogwood (63.4), loblolly pine (53.5), red maple (49.6), tulip poplar (38.5), black gum (31.1), and black cherry (28.1).

Volume of Merchantable Timber - Volume of merchantable timber in the EMDF forest north of Bear Creek Road totals 404,401 board feet (bf, International $\frac{1}{4}$ " rule), averaging 4,209 bf per acre (Appendix E, Table E5). Tulip poplar (141,237 bf), and white oak (76,722 bf) collectively contribute 54% of the merchantable timber in this area. Species rank for number of merchantable stems (Appendix E, Table E4) includes, tulip poplar (730), white oak (388), sweet gum (321), red maple (220) and loblolly pine (190). Appendix E, Table E6, provides the merchantable volume ranking at the genus level. Tulip poplar and oaks account for 65% of the marketable timber in the area.

Large Diameter Trees – Appendix E, Table E7 provides a list of the largest diameter trees of selected species, and a count of all tally trees ≥ 30 inches dbh, measured at sample points in the area. The tally tree with greatest dbh in the area is a 38.0-inch chestnut oak. There are 10 tally trees with dbh ≥ 30 inches, of which 6 are oaks.

The 33 acres of forest within portion of the proposed EMDF south of Bear Creek Road has not been recently inventoried and was almost entirely subject to timber harvesting during a southern pine beetle (SPB) outbreak in 2000. Dense regeneration of loblolly pine provides the dominant cover and it's per acre basal area, density and merchantability will mirror the loblolly statistics for the area to the north.

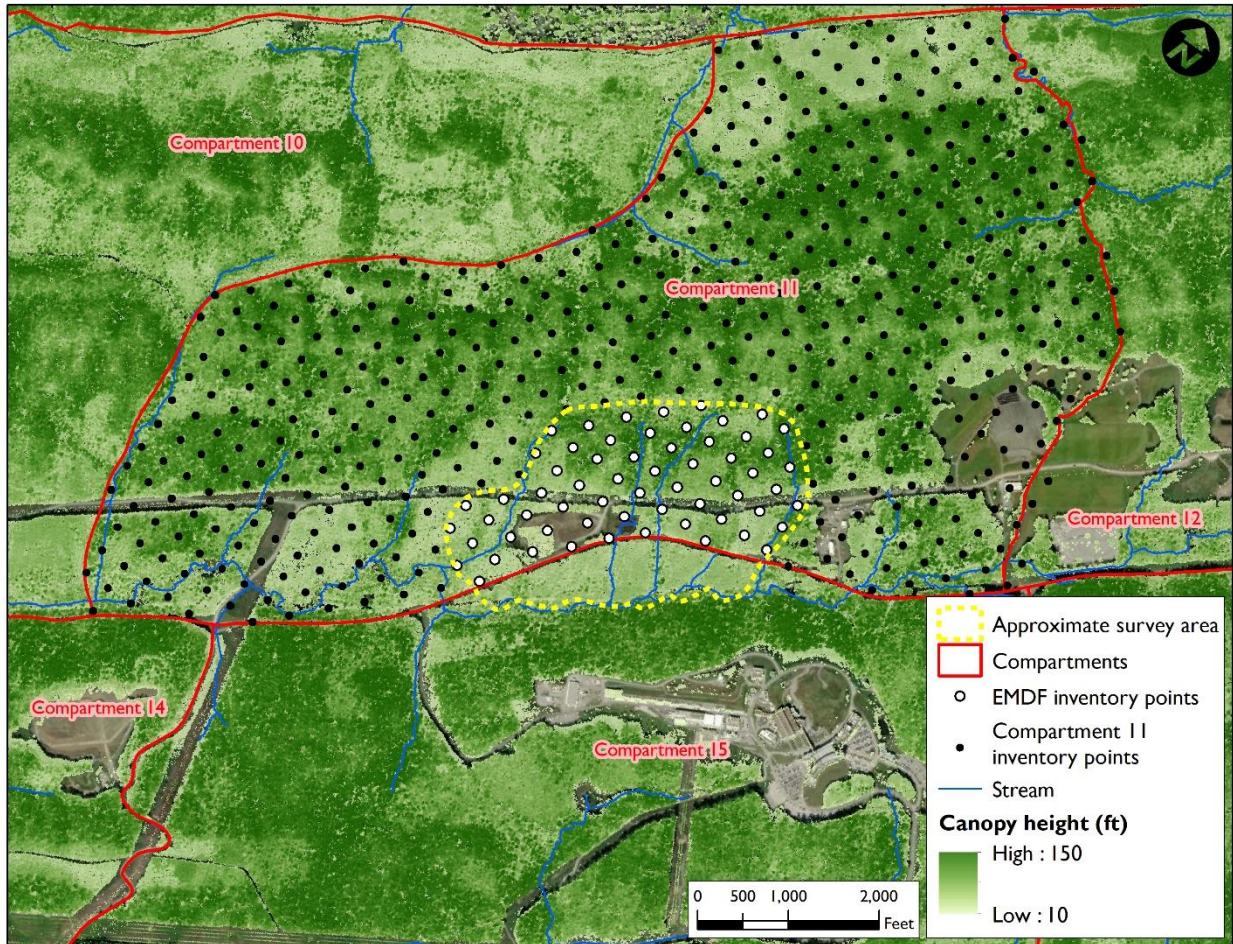


Figure 5. Forest inventory map for the proposed EMDF site and vicinity.

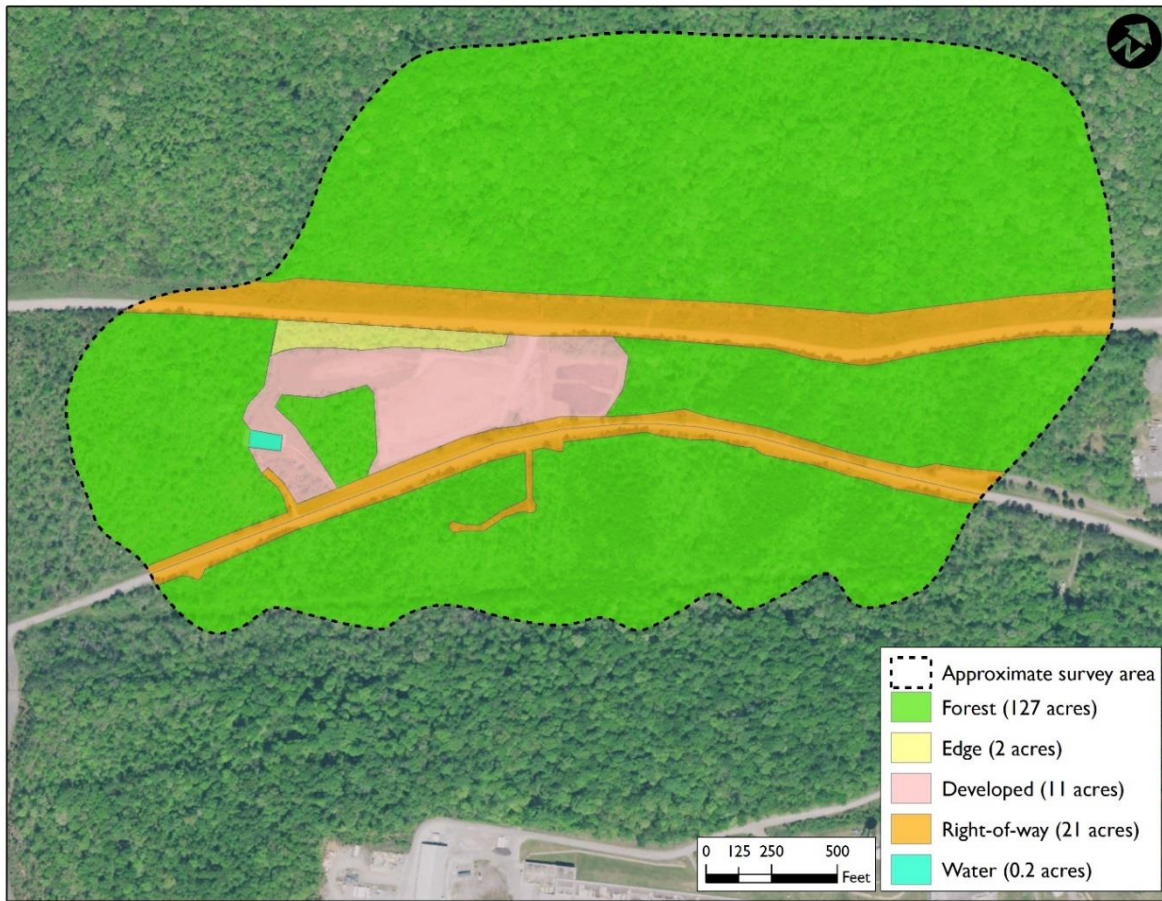


Figure 6. Spatial distribution of land use types for the proposed EMDF site.

3.3.2 TIMBER DISPOSAL AND WILDLAND FIRE CONSIDERATIONS

An evaluation of how timber would be removed from a site is an important aspect of the timber assessment, as it impacts project decision-making regarding pre-construction planning, schedule, and cost. Timber (the marketable portion of the forest) is considered a DOE Real Estate asset, and as a federally owned property must be disposed via the Oak Ridge Office (ORO) Real Estate Officer who maintains a standing timber sale agreement with a timber buyer.

The Reservation Forester coordinates the execution of the agreement on behalf of the Real Estate Officer and any supported project's interface with logging personnel would be via the Forester. Among other terms, the agreements will specify "The Guide to Forestry Best Management Practices in Tennessee" as appropriate erosion control guidance, and other requirements such as OSHA Title 29 CFR, Part 1910.266, "Logging Operations". During field surveys to determine the forest conditions, a general plan was developed for harvesting equipment to reach the timber, staging areas (log landings) to handle and load logs, and safe egress of loaded log trucks to reach public roads and marketing venues.

Figure 7 depicts the EMDF site topography, developed access and forest. Potential log landings and additional access to them are shown in green. Generally, these are on the accessible high ground spacious enough to maneuver vehicles. In some instances, particularly off Bear Creek Road, these would be located at the sites of previous log landings. As much as possible, these will need to be away from streams and wetlands such that logs are moved away from them and taken to the landing points (potential

skidding directions shown in red). Actual locations may vary depending on weather, additional avoidance concerns, and the particular apparatus utilized by the logging crew.

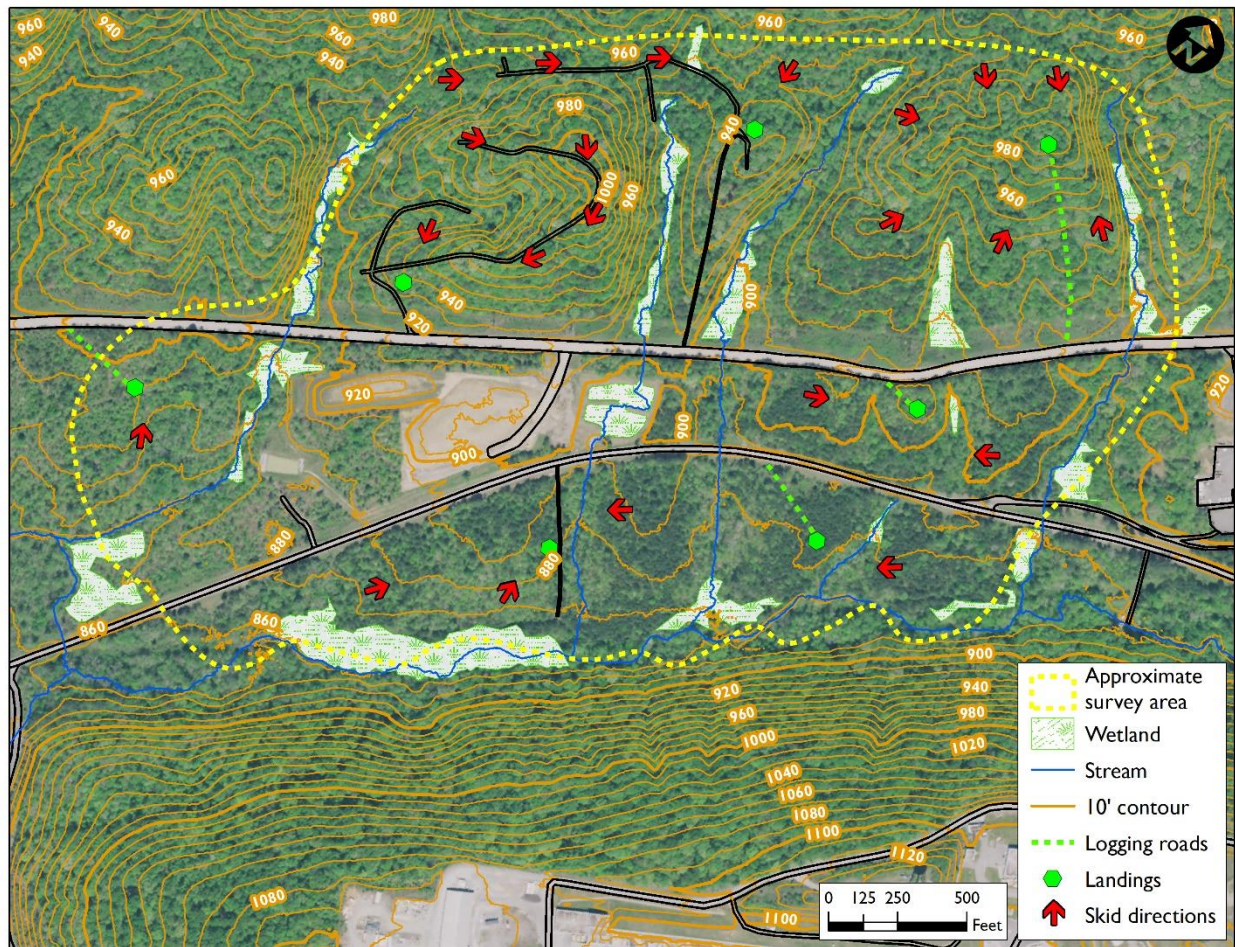


Figure 7. EMDF site topography, developed access, and forest.

The preferred method for disposing of woody debris is in situ mulching. To limit the impact of complete vegetation removal, this can be performed on piecemeal, depending on the pace of the site's grade work (while taking care not to leave behind pockets of debris that may become inaccessible and unacceptable wildfire fuel loads). Alternatively, woody debris may be burned in place with trench, pile or windrow burning.

Construction of EMDF at the proposed location will create additional interface with the reservation's wildfire fuels, requiring application of current, applicable NFPA (Standards 1141, 1143, and 1144), or International Wildland-Urban Interface codes. The proposed EMDF site lies in two fire management units, #11 Gum Branch, and #15 SNS, which are separated by Bear Creek Road. Construction would force a redefinition of the unit boundaries and some alteration of existing fire plans. Response times to and through the area following completion of the proposed Bear Creek Road relocation should remain unchanged. Wildfire fuel within and surrounding the EMDF site are depicted in Figure 8. Fuel beds may need to be modified (clearing and maintaining setbacks, reducing residual fuel loads presented by dead and dense vegetation or logging slash) to ensure safe conditions remain post-construction.

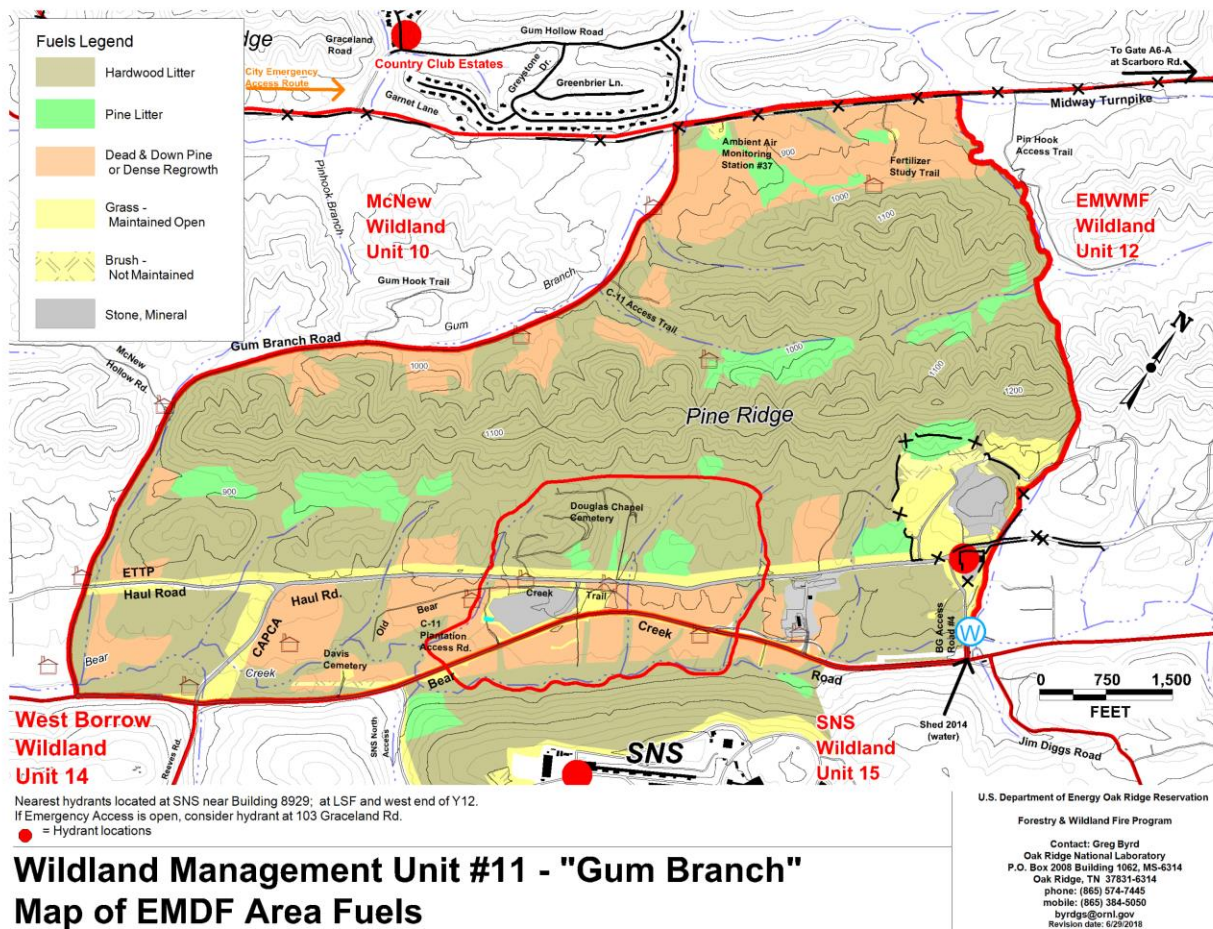


Figure 8. Wildland Fire Management Units depicting area fuels for the proposed EMDF site area.

3.3.3 HISTORICAL FOREST TYPES

Understanding previous land use provides insight into factors leading to current forest conditions. A review of local 1935 TVA aerial photography provides excellent coverage of the EMDF site environs; In its pre-acquisition-from-the-federal-government state, the area was 66% open field and 34% forested. Approximately half the forested area was composed of young growth in an early successional state where agricultural practices (crops, grazing) in many fields had been more recently abandoned.

Although a formal forest management program would not be established until 1964, during the post-war period, a forest conservation program was undertaken on the ORR. The initial plantings were contracted through Management Services Incorporated from 1947 to 1954, mainly on the numerous old field sites located primarily in the valleys and lower slopes. The principal goal was rapid reforestation of abandoned agricultural lands.

A review of forest type maps created by the ORNL Forest Management Program between 1976 and 1981 indicate that within the EMDF study area, fields south of the present-day haul road (those mostly previously used as cropland) were planted with loblolly pine in 1948 and 1949. Additional areas to the west were later planted in 1978. On the other hand, fields north of this area were allowed to succeed naturally, becoming stands dominated by native Virginia and shortleaf pines, as well as tulip poplar. (Archived Forest Type Maps are available from the ORNL Forest Management Office).

The earlier planted pine was managed by thinning in the 1960's and 1980's, and by prescribed burnings between 1972 and 1983. Unfortunately, despite this management and withstanding previous southern pine beetle outbreaks in 1965, 1972 and 1993, pines in this area succumbed to the insects in 2000. The planted trees, being of superior form and more accessible, were harvested at that time. Native pines, being among less accessible watersheds, were left to become pockets of dead and down timber. Other than these episodic thinnings and salvage pine harvests, there have been no other timber harvests documented within the EMDF study area.

3.4 RARE SPECIES SURVEYS

3.4.1 PLANT SURVEYS

Tuberclad rein orchid (*Platanthera flava* var. *herbiola*) is listed as *Threatened* on the Tennessee Rare Plant List. The orchid is found along Bear Creek and all tributaries within the project boundary. In particular, there are large populations of orchids in the NT9-B and D10W-B wetlands. These populations both have hundreds of plants, which are the largest known populations of tuberclad rein orchid on the ORR, and are also considered a large populations for the state of Tennessee as a whole.

In addition to the Tuberclad Rein Orchid, three other plant species of interest were found. American ginseng (*Panax quinquefolius*) is listed as *Special Concern-Commercially Exploited*. This means it is an uncommon plant that requires status monitoring because it has scientific value or a highly specific habitat; it is also threatened by commercial harvest. Pink lady's-slipper (*Cypripedium acaule*) is listed as *Commercially Exploited*. This means that although it is not rare, it is threatened by commercial harvest. Since ginseng and pink lady's-slipper are common on the ORR, an extensive search was not conducted for these two species. It is likely that more occur. Canada lily (*Lilium canadense*) is no longer listed on the Tennessee Rare Plant List; however, it is still monitored on the ORR. Locations for these plants are shown in Figure 9.

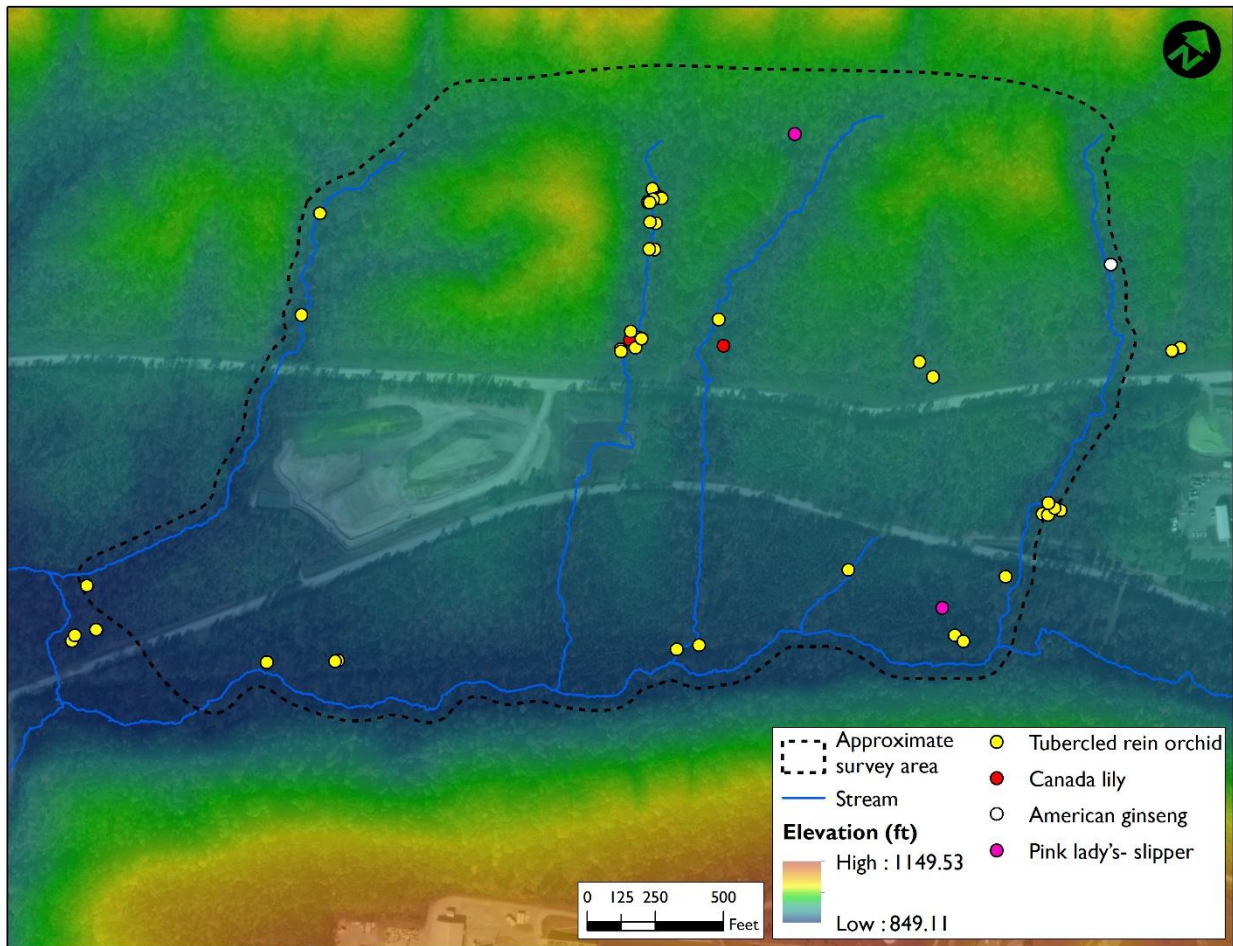


Figure 9. Map showing locations of four rare plant species within and adjacent to the study area.

3.4.2 BAT SURVEYS

The Endangered Species Act (ESA, 1973) requires that federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS), ensure that actions they authorize, fund, or carry out do not threaten the existence of any plant or animal species listed as threatened or endangered. Additionally, actions of these agencies cannot result in destruction of habitat critical to the survival of these listed species. The Oak Ridge Reservation (ORR) is home to several bat species which are federally-listed as endangered or threatened (McCracken, et al., 2015). Further, these and additional bat species are state-listed by the Tennessee Wildlife Resources Agency (TWRA) as endangered, threatened or in need of management (TWRA, 2017). Table 3 lists these species and their status on these lists. The USFWS created a Conservation Strategy for Forest-dwelling Bats in Tennessee which delineates seasonal habitat use by two of the federally-listed bats, Indiana bat, *Myotis sodalis* and northern long-eared bat, *Myotis septentrionalis*, and informs on protected habitat range size defined for each season and bat reproductive condition (USFWS-TFO, 2017). The Conservation Strategy references guidance on required survey protocols, need for informal and formal consultation with the USFWS Tennessee Field Office, and outlines appropriate mitigation actions, should they be needed.

Bat surveys were conducted within the EMDF study area in 2017 and 2018. Table 4 lists survey sites for both years, including deployment duration and GPS location information. The bat acoustic monitoring

locations for 2017 and 2018 within the EMDF site are shown in Figure 10, and tree canopy height is also indicated.

Table 3. Listed bats found on the Oak Ridge Reservation.

Species abbrev.	Species Name	Common Name	Federal List Status	Tennessee State List Status
MYGR	<i>Myotis grisescens</i>	Gray bat	Endangered	Endangered
MYLE	<i>Myotis leibii</i>	Eastern Small-footed bat	Not listed	In need of management
MYLU	<i>Myotis lucifugus</i>	Little brown bat	Not listed	Threatened
MYSE	<i>Myotis septentrionalis</i>	Northern Long-eared bat	Threatened	Threatened
MYSO	<i>Myotis sodalis</i>	Indiana bat	Endangered	Endangered
PESU	<i>Perimyotis subflavus</i>	Tricolored bat	Not listed	Threatened
CORA	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	Not listed	In need of management

Table 4. GPS locations and deployment information for each acoustic monitoring site within the proposed EMDF project area.

Survey Start Date	Nights deployed	Site ID	Lat.	Long.	Site Description
07/31/2017	7	17-33	35.958540	-84.310339	Open hardwood forest
		17-36	35.955238	-84.312575	Open hardwood forest
		17-37	35.956554	-84.311097	Open hardwood forest
		17-38	35.956625	-84.312692	Open hardwood forest
05/02/2018	23	18-1	35.957526	-84.312698	Gravel road/Open hardwood forest
		18-2	35.958540	-84.310340	Gravel road/Open hardwood forest
		18-3	35.959585	-84.308882	Open bottomland forest
		18-4	35.960473	-84.308020	Shrubby bottomland forest
		18-5	35.955876	-84.311573	Shrubby hardwood forest
		18-6	35.959176	-84.307909	Gravel road/Open hardwood forest
		18-7	35.952424	-84.309288	Bear Creek/Riparian forest
		18-8	35.954019	-84.309151	Gravel road/Pine forest

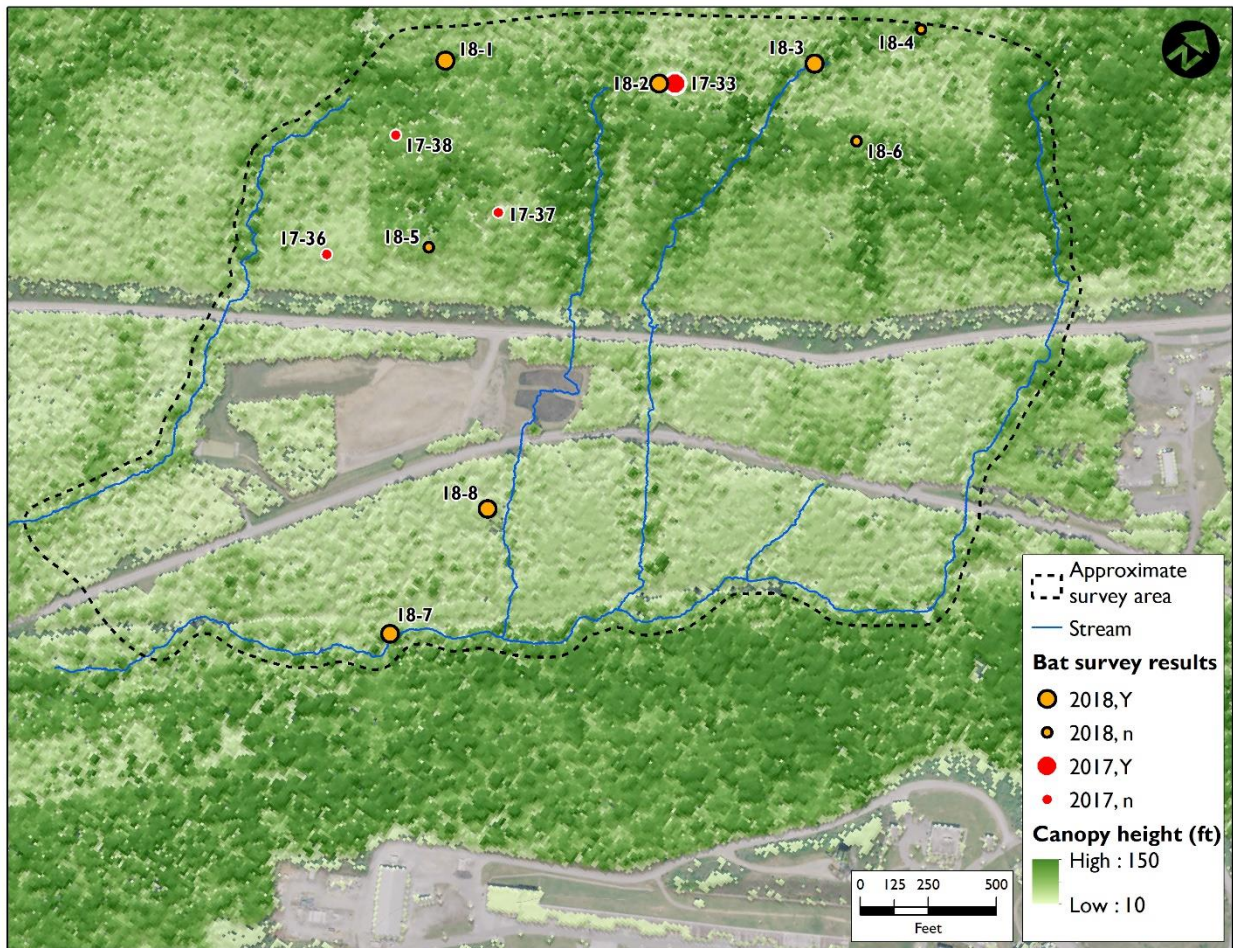


Figure 10. Bat acoustic survey sites on the proposed EMDF site. Red dots represent 2017 survey sites, and orange dots represent 2018 survey sites. Larger red and orange dots indicate sites where calls of state and federally-listed threatened and endangered bats were recorded.

Analysis of recorded bat calls at all sites indicate that the open forested portions of the proposed EMDF site are used as summer habitat by state and federally-listed bat species. Call numbers recorded for each listed species at acoustic recorder sites are listed in Table 5.

Table 5. Results of Acoustic Monitoring for State and Federal Listed Bat Species on the Proposed EMDF Site. Number of bat calls recorded are listed per site. Number of calls does not correspond to number of bats. Survey sites not present in this table did not result in recorded calls of state or federally-listed bat species.

Site ID	MYGR	MYLE	MYLU	MYSE	MYSO	PESU
17-33	68		197		2	19
18-1	209		168		2	35
18-2	471	1	116		7	40
18-3	5	1	58			6
18-7			1			9
18-8	75	1	94	2	8	34

The two state-listed as in need of management species are Rafinesque’s big-eared bat and eastern small-footed bat. No calls were recorded for Rafinesque’s big-eared bat, and one eastern small-footed bat call

was recorded at each of 3 sites during spring when the bats are moving on the landscape to their summer locations. EMDF site impacts to these bat species are unlikely.

One species listed as threatened both federally and on the Tennessee state list, northern long-eared bat, had two calls recorded at Site 18-8 on the same night during spring migration to summer roosting habitat. Northern long-eared bat populations have declined precipitously across their range due to White-Nose Syndrome, and the small number of calls recorded would indicate minimal presence on the proposed EMDF site for roosting, foraging or movement to other foraging areas.

Large numbers of calls from one state and federally-listed endangered species, gray bat, indicate usage across the forested areas of the proposed EMDF site. This species is prevalent across the ORR. No gray bat summer or winter roosting caves have been confirmed within the ORR, however foraging habitat and/or travel corridors to foraging grounds exist within the proposed EMDF site.

Little brown bat and tri-colored bat calls were also recorded in large numbers across the EMDF site. Both species are state-listed threatened, and both species likely roost and forage within the site.

A small number of Indiana bat calls were recorded at four acoustic recording sites. This state and federally-listed endangered species may roost and forage within the EMDF site, but no maternity roost trees have been identified within the site.

3.4.3 OTHER MAMMAL SURVEYS

Small mammal species captured on the site included mice in the *Peromyscus* genus (white-footed mouse and deer mouse), and woodland vole. Other mammals seen or identified by sign (tracks, scat, etc.) included white-tailed deer, coyote, bobcat, raccoon, skunk, opossum, eastern gray squirrel, and eastern chipmunk (Table 6). No federal or state listed terrestrial mammalian species were recorded for the site.

Table 6. Observed mammals and their habitat requirements.

Mammals	Habitat Requirements
Bobcat (<i>Lynx rufus</i>)	heavily forested
Eastern Chipmunk (<i>Tamias striatus</i>)	forest
Coyote (<i>Canis latrans</i>)	variable
Opossum (<i>Didelphis virginiana</i>)	forest, suburban
<i>Peromyscus spp.</i> (mouse)	forest
Raccoon (<i>Procyon lotor</i>)	along wooded streams; variable
Striped Skunk (<i>Mephitis mephitis</i>)	forest, suburban
Eastern Gray Squirrel (<i>Sciurus carolinensis</i>)	dense hardwood; suburban, urban
White-tailed Deer (<i>Odocoileus virginianus</i>)	generally wooded areas, field, edges
Woodland Vole (<i>Pitymys pinetorum</i>)	forest, open hardwoods

3.4.4 REPTILE AND AMPHIBIAN SURVEYS

Amphibians seen or heard at this location during the survey included American bullfrog, American Toad, Cope’s gray treefrog, green frog, upland chorus frog, spring peeper, pickerel frog, and northern dusky salamander. These are all common species to the ORR. Reptiles seen on the site included eastern box

turtle, eastern black kingsnake, gray ratsnake, and *Plestiodon* spp. (skink). No state or federally listed reptile or amphibian species were recorded on the site during these surveys. Table 7 lists all reptiles and amphibians recorded on the site.

Table 7. Observed reptiles and amphibians and their habitat requirements.

Reptiles and Amphibians	Habitat Requirements
American Toad (<i>Anaxyrus americanus</i>)	widespread, within access to water for breeding
Cope's Gray Treefrog (<i>Hyla chrysoscelis</i>)	canopy of trees, within access to water for breeding
Northern Dusky Salamander (<i>Desmognathus fuscus</i>)	streams and seepage areas
Gray Treefrog (<i>Hyla versicolor</i>)	canopy of trees, within access to water for breeding
Spring Peeper (<i>Pseudacris crucifer</i>)	wooded and brushy areas close to water
Upland Chorus Frog (<i>Pseudacris feriarum</i>)	swampy areas of woodlands, heavily vegetated ponds
Pickerel Frog (<i>Lithobates palustris</i>)	cool wooded streams, creeks, and springs
Eastern Black Kingsnake (<i>Lampropeltis nigra</i>)	woodlands, fields edges, near streams, farms, and suburban
Eastern Box Turtle (<i>Terrapene carolina</i>)	moist, open forest, often near floodplains
Gray Ratsnake (<i>Pantherophis spiloides</i>)	woodlands, fields edges, near streams, farms, and suburban
<i>Plestiodon</i> spp. (skink)	variable woodland areas

3.4.5 BIRD SURVEYS

Fifty-five bird species were observed throughout the site (Appendix F). No birds federal or state listed threatened or endangered bird species were noted during the surveys; however, certain species recorded during the surveys have other state and/or federal management designations. All species encountered are to be expected during the survey dates that sampling was completed (May 2018).

The site is on the southern edge of the largest area of contiguous interior forest on the ORR (Giffen et. al. 2012.) These areas support bird species rare or not typically found in more fragmented habitats. Sixteen species of birds typically found in these unfragmented habitats were recorded on the subject site during the surveys. This includes the wood thrush, recently listed by the state of Tennessee as “in need of management” due to declining numbers in the state. Wood thrush is also on the USFWS list of birds of “management concern”. As has been noted state-wide, the number of wood thrushes on the ORR appears to be on the decline (Roy, et. al. 2014). Other bird species recorded during the surveys of the proposed EMDF site that are on the USFWS list of birds of “management concern” include American woodcock, blue-winged warbler, chuck-will’s widow, and Kentucky warbler.

Ovenbird, a ground-nesting bird experiencing population decline across the state of Tennessee, was also recorded on the site. Yellow-throated vireo and whip-poor-will are two other species present on this site

that appear to be in decline on the reservation. Prairie warbler, a forest edge and field species, is another species found on the site that is in apparent decline on the ORR (Roy, et. al. 2014).

4. SUMMARY

Wetland surveys in the area of the proposed EMDF found extensive acreage of jurisdictional wetland. Seventeen separate wetlands are located within or partially within the EMDF study area, comprising 11.81 acres of wetland, some of which may be near or outside of the actual area used for the EMDF. The wetlands are largely found in conjunction with Bear Creek and its tributary streams.

Stream surveys identified 5 separate tributary stream sections within the EMDF study area covering 3303 meters of stream. Fish communities within the five tributaries to Bear Creek that lie within the proposed area for the EMDF are typical of other first and second order streams in this watershed. No Tennessee dace, a species listed in need of management by the state of Tennessee, were observed in these surveys; however, they do occur throughout the watershed and are known to migrate in small streams annually.

The timber assessment documented 36 species of trees within the EMDF study area. Tulip poplar is the single most common species of mature tree by quantity and volume. There is ample merchantable timber on the site. Merchantable trees are real estate assets and DOE has a mechanism in place for their disposal. EMDF access, egress and terrain are favorable for safe logging. The EMDF site will both influence and become a component of the reservation's wildland-urban interface.

Rare species surveys found rare plant and animals using the EMDF site. Four rare plant species identified within the EMDF study area include: tubercled rein orchid (*Platanthera flava* var. *herbiola*), American ginseng (*Panax quinquefolius*), pink lady's-slipper (*Cypripedium acaule*), and Canada lily (*Lilium canadense*). Of these, tubercled rein orchid is the rarest species. This species was found in every tributary and along Bear Creek, but the largest populations are found along Tributaries NT9 and D10W. These populations are the largest on the ORR and are considered large for the state.

Results indicate that several state and federally-listed bat species are found at the proposed EMDF site. Drainages and wetlands on the site support relatively diverse amphibian populations. The area is on the southern edge of the largest area of contiguous interior forest on the ORR. Several forest bird species that can be impacted by forest fragmentation were recorded on the site, including a species listed by the state as "in need of management", species listed federally as being of "management concern", and species in decline on the ORR.

5. REFERENCES

- ACOE (Army Corps of Engineers). 1987. Wetlands Delineation Manual. U. S. Army Corps of Engineers. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg, MS.
- Giffen, N. R., M. J. Peterson, S. Reasor, L. R. Pounds, G. S. Byrd. 2009. Wetland and Sensitive Species Survey Report for Y-12: Proposed Uranium Processing Facility (UPF). Oak Ridge National Laboratory, Oak Ridge, TN.
- Giffen, N. R., D. C. Wade, and M. A. Mueller. 2012. *Interior Forest Areas of the Oak Ridge Environmental Research Park*. ORNL/TM-2012/388. Oak Ridge National Laboratory, Oak Ridge, TN.
- McCracken, M.K., N.R. Giffen, A.M. Haines, B.J. Guge and J.W. Evans. 2015. Bat Species Distribution on the Oak Ridge Reservation. ORNL/TM-2015/248. Oak Ridge National Laboratory, Oak Ridge, TN.
- Niemiller, M., Reynolds, R. and Miller, B. (2013). *The Reptiles of Tennessee. 1st ed.* Knoxville: The University of Tennessee Press.
- Niemiller, M., Reynolds, R. (2011). *The Amphibians of Tennessee*, Knoxville: The University of Tennessee Press.
- Reid, F. A. (2006) *A Field Guide to Mammals of North America*, Boston: Houghton Mifflin Company.
- Roy, W. K., N. R. Giffen, M. C. Wade, A. M. Haines, J. W. Evans, and R. T. Jett. 2014. *Oak Ridge Reservation Bird Records and Population Trends*. ORNL/TM-2014/109. Oak Ridge National Laboratory, Oak Ridge, TN.
- Sibley, D.A. (2000) *The Sibley Guide to Birds*, New York: Andrew Stewart Publishing.
- Tennessee Department of Environment and Conservation (TDEC). 2004. Stream Mitigation Guidelines for the State of Tennessee. Division of Water Pollution Control, Nashville, Tennessee. (https://www.tn.gov/content/dam/tn/environment/water/documents/water_permit_stream-mitigation-guidelines.pdf)
- Tennessee Department of Environment and Conservation (TDEC). 2011. Guidance for Making Hydrologic Determinations Version 1.4. Division of Water Pollution Control, Nashville, Tennessee. (https://www.tn.gov/content/dam/tn/environment/documents/guid_hydro_det.pdf)
- Tnwatchablewildlife.org. (2018). *Tennessee Watchable Wildlife*, Available at: <http://www.tnwatchablewildlife.org/> [Accessed 4 Jun. 2018].
- Tennessee Wildlife Resources Agency. (2017). Tennessee Threatened and Endangered Species List: New Rules. <https://www.tn.gov/content/dam/tn/twra/documents/1660-01-32-threatened-endangered-species-rule.pdf>.
- U.S Fish and Wildlife Service, Tennessee Ecological Services Field Office. (2017). Conservation Strategy for Forest-dwelling Bats in Tennessee. https://www.fws.gov/cookeville/pdfs/TN_Conserv_Strat_forest_dwelling_bats_171005.pdf.
- www.fws.gov. (2018). *Listed species believed to or known to occur in Tennessee*, Available at: <https://ecos.fws.gov/> [Accessed 4 Jun. 2018]

APPENDIX A- RARE SPECIES SURVEY POINT COORDINATES

Point	Latitude	Longitude
1	35.95693807	-84.3132626
2	35.95824247	-84.3117613
3	35.9592062	-84.3098471
4	35.96025626	-84.3080737
5	35.9530638	-84.3136829
6	35.95481493	-84.3132912
7	35.95584778	-84.3113804
8	35.95694977	-84.3095172
9	35.95779738	-84.307524
10	35.95883051	-84.3057434
11	35.95789156	-84.3047619
12	35.95682566	-84.3064585
13	35.95617677	-84.3085656
14	35.95570198	-84.3059173
15	35.9545143	-84.3076709
16	35.95353125	-84.3095728

APPENDIX B –WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT9-A City/County: Roane Sampling Date: 5/15/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT9-A
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'32.67"N Long: 84°18'17.26"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.92 acre wetland located north of the Haul Road This wetland contains two community types: palustrine forested and palustrine emergent. The forested community is located along most of NT9 until it reaches the previously cleared powerline and become an emergent community. The finger to the east is also an emergent community.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: forms along the two forks of NT9 majority of NT9-A forms a long narrow wetland along the western fork, but a small finger extends following a short segment of the eastern fork variable surface water depending on proximity to streams, seeps and drainages	

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

Sampling Point: NT9-A

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Red Maple (<i>Acer rubrum</i>)	10		FAC	
2. Sweetgum (<i>Liquidambar styraciflua</i>)	10		FAC	
3. Black Willow (<i>Salix nigra</i>)	15	D	OBL	
4. American Elm (<i>Ulmus Americana</i>)	15	D	FACW	
5. Green Ash (<i>Fraxinus pennsylvanica</i>)	10		FACW	
6. _____				
				60 = Total Cover
				50% of total cover: 30 20% of total cover: 12
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
<u>Shrub Stratum</u> (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	10		FAC	
2. Green Ash (<i>Fraxinus pennsylvanica</i>)	20	D	FACW	
3. _____				
4. _____				
5. _____				
6. _____				
				30 = Total Cover
				50% of total cover: 15 20% of total cover: 6
<u>Herb Stratum</u> (Plot size: _____)				
1. Jewelweed (<i>Impatiens capensis</i>)	25	D	FACW	
2. Hog peanut (<i>Amphicarpaea bracteata</i>)	15	D	FAC	
3. Poison Ivy (<i>Toxicodendron radicans</i>)	15	D	FAC	
4. Fringed Sedge (<i>Carex crinita</i>)	10		OBL	
5. Spike Rush (<i>Eleocharis palustris</i>)	10		OBL	
6. Stilt Grass (<i>Microstegium vimineum</i>)	10		FAC	
7. Poa sp.	10		-	
8. Water Hemlock (<i>Ciculata maculata</i>)	2		OBL	
9. Stiff Cowbane (<i>Oxypolis rigidior</i>)	2		OBL	
10. Tubercled Rein Orchid (<i>Platanthera flava</i> va)	1		FACW	
11. _____				
				100 = Total Cover
				50% of total cover: 50 20% of total cover: 20
<u>Woody Vine Stratum</u> (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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

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

SOIL

Sampling Point: NT9-A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	7.5YR 5/1	60	7.5YR 5/6	40	C	M	SiL	-emergent community near
4-12	2.5Y 5/1	98	7.5Y 5/6	2	C	M	SiL	NT-9 and Haul Road -25% organic matter
0-2	2.5Y 3/2	60	2.5Y 4/1	40			SiL	-second sample taken ~10ft
2-4	2.5Y 5/1	50	2.5Y 4/1	30	C	M	SiL	from flag 18
			10YR 5/8	20			SiL	
4-8	10YR 6/1	55	10YR 5/8	45	C	M	SiL	
8-12	10YR 6/1	60	10YR 6/6	40	C	M	SiL	

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

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) <input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: No Soil Map Unit Data available for this area

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT9-B City/County: Roane Sampling Date: 6/15/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT9-B
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'26.27"N Long: 84°18'15.30"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.41 acre wetland located north of Bear Creek Road along the east side of NT9			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks) 	<p>Secondary Indicators (minimum of two required)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<p>Field Observations:</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: surface depressions and drainage patterns seasonably high ground water table and water flow over the ground surface	

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

Sampling Point: NT9-B

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Sweetgum (<i>Liquidambar styraciflua</i>)	10		FAC	
2. Sycamore (<i>Platanus occidentalis</i>)	20	D	FACW	
3. Green Ash (<i>Fraxinus pennsylvanica</i>)	20	D	FACW	
4. Red Maple (<i>Acer rubrum</i>)	20	D	FAC	
5. Red cedar (<i>Juniperus virginiana</i>)	5		FACU	
6. _____				
				75 = Total Cover
				50% of total cover: 37.5 20% of total cover: 15
Sapling Stratum (Plot size: _____)				
1. Flowering Dogwood (<i>Cornus florida</i>)	5		FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Shrub Stratum (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	30	D	FAC	
2. Sweetgum (<i>Liquidambar styraciflua</i>)	10		FAC	
3. _____				
4. _____				
5. _____				
6. _____				
				40 = Total Cover
				50% of total cover: 20 20% of total cover: 8
Herb Stratum (Plot size: _____)				
1. Cherokee Sedge (<i>Carex cherokeensis</i>)	30	D	FACW	
2. Tuberled Rein Orchid (<i>Platanthera flava</i> var)	20	D	FACW	
3. Jewelweed (<i>Impatiens capensis</i>)	15		FACW	
4. Spike Rush (<i>Eleocharis palustris</i>)	10		OBL	
5. Hog peanut (<i>Amphicarpaea bracteata</i>)	10		FAC	
6. Fringed Sedge (<i>Carex crinita</i>)	5		OBL	
7. Frank's Sedge (<i>Carex frankii</i>)	2		OBL	
8. Water Hemlock (<i>Ciculata maculata</i>)	2		OBL	
9. Stiff Cowbane (<i>Oxypolis rigidior</i>)	2		OBL	
10. _____				
11. _____				
				96 = Total Cover
				50% of total cover: 48 20% of total cover: 19.2
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____

Remarks: (Include photo numbers here or on a separate sheet.)
 Hundreds of Tuberled Rein Orchid (*Platanthera flava* var. *herbiola*)

Dominance Test worksheet:	
Number of Dominant Species That Are OBL, FACW, or FAC:	6 (A)
Total Number of Dominant Species Across All Strata:	6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100 (A/B)
Prevalence Index worksheet:	
Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals:	_____ (A) _____ (B)
Prevalence Index = B/A = _____	
Hydrophytic Vegetation Indicators:	
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation	
<input checked="" type="checkbox"/> 2 - Dominance Test is >50%	
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
<input type="checkbox"/> 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT9-C City/County: Roane Sampling Date: 6/4/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'23.08"N Long: 84°18'15.30"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydic Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: 0.28 acre wetland located along wetland NT9 on the south side of Bear Creek Road		

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>	<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> (includes capillary fringe)</p> <p align="right">Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:</p> <p>Remarks: High ground water table, periodic over banking of NT9, and drainage from Bear Creek Road and the surrounding forest. Surface water was present throughout much of the area after multiple days of heavy rain, but water only remained in micro depressions by the following week when the site was revisited. Other hydrology indicators included wet leaves, soil deposits and crayfish burrows. The water table was at 3-4 inches the week after the major rain event. Multiple drainage patterns could be seen throughout the wetland. There are small sections of sparsely vegetated ground where the heaviest water flow likely occurs during storm events.</p>
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VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: NT9-C

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Red Maple (<i>Acer rubrum</i>)	30	D	FAC	
2. Sycamore (<i>Platanus occidentalis</i>)	5		FACW	
3. _____				
4. _____				
5. _____				
6. _____				
35 = Total Cover				
50% of total cover: 17.5 20% of total cover: 7				
<u>Sapling Stratum</u> (Plot size: _____)				
1. Ironwood (<i>Carpinus caoliniana</i>)	3		FAC	
2. Sweetgum (<i>Liquidambar styraciflua</i>)	1		FAC	
3. _____				
4. _____				
5. _____				
6. _____				
4 = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	50	D	FAC	
2. Alder (<i>Alnus serrulata</i>)	10		OBL	
3. Ironwood (<i>Carpinus caoliniana</i>)	5		FAC	
4. Sweetgum (<i>Liquidambar styraciflua</i>)	5		FAC	
5. Privet (<i>Ligustrum japonicum</i>)	1		UPL	
6. Red cedar (<i>Juniperus virginiana</i>)	1		FACU	
72 = Total Cover				
50% of total cover: 36 20% of total cover: 14.4				
<u>Herb Stratum</u> (Plot size: _____)				
1. Jewelweed (<i>Impatiens capensis</i>)	40	D	FACW	
2. Poison Ivy (<i>Toxicodendron radicans</i>)	25	D	FAC	
3. Soft rush (<i>Juncus effusus</i>)	10		FACW	
4. Stilt Grass (<i>Microstegium vimineum</i>)	10		FAC	
5. Spotted joe-pye weed (<i>Eutrochium maculatum</i>)	3		FACW	
6. Virginia creeper (<i>Parthenocissus quinquefolia</i>)	3		FACU	
7. Hog peanut (<i>Amphicarpaea bracteata</i>)	2		FAC	
8. Wild yam (<i>Dioscorea villosa</i>)	2		FAC	
9. Muscadine (<i>Vitis rotundifolia</i>)	1		FAC	
10. Strawberrybush (<i>Euonymus americanus</i>)	1		FAC	
11. _____				
97 = Total Cover				
50% of total cover: 48.5 20% of total cover: 19.4				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT9-D City/County: Roane Sampling Date: 6/4/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'20.44"N Long: 84°18'15.77"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydic Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.20 acre wetland located approximately 35 feet south of NT9-B. The wetland begins along the southernmost portion of NT9 before the tributary empties into Bear Creek. The wetland then curves to follow the riparian zone of Bear Creek			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p>Secondary Indicators (minimum of two required)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Moss Trim Lines (B16)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input type="checkbox"/> Crayfish Burrows (C8)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td> </tr> <tr> <td><input type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> Microtopographic Relief (D4)</td> </tr> <tr> <td><input checked="" type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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<p>Field Observations:</p> <table style="width:100%;"> <tr> <td>Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></td> <td>Depth (inches): _____</td> </tr> <tr> <td>Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></td> <td>Depth (inches): <u>4</u></td> </tr> <tr> <td>Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></td> <td>Depth (inches): <u>0</u></td> </tr> </table>	Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>4</u>	Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0</u>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>																												
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____																																		
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>4</u>																																		
Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0</u>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks: close proximately to Bear Creek and a major tributary multiple wet weather conveyances wettest in drainages concave surfaces with sparse vegetation (10ft or more diameter)																																			

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

Sampling Point: NT9-D

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Sweetgum (Liquidambar styraciflua)</u>	25	D	FAC	
2. <u>Red Maple (Acer rubrum)</u>	25	D	FAC	
3. <u>Sycamore (Platanus occidentalis)</u>	10		FACW	
4. <u>Redbud (Cercis canadensis)</u>	5		FACU	
5. _____				
6. _____				
65 = Total Cover				
50% of total cover: 32.5 20% of total cover: 13				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. <u>Sweetgum (Liquidambar styraciflua)</u>	40	D	FAC	
2. <u>Spicebush (Lindera benzoin)</u>	20		FAC	
3. <u>Green Ash (Fraxinus pennsylvanica)</u>	5		FACW	
4. <u>Ironwood (Carpinus caoliniana)</u>	5		FAC	
5. <u>Red Maple (Acer rubrum)</u>	5		FAC	
6. <u>Flowering Dogwood (Cornus florida)</u>	2		FACU	
77 = Total Cover				
50% of total cover: 38.5 20% of total cover: 15.4				
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Prairie Wedgescale (Sphenopholis obtusata)</u>	25	D	FAC	
2. <u>Stilt Grass (Microstegium vimineum)</u>	20	D	FAC	
3. <u>Jewelweed (Impatiens capensis)</u>	15	D	FACW	
4. <u>Cherokee Sedge (Carex cherokeensis)</u>	10		FACW	
5. <u>Poison Ivy (Toxicodendron radicans)</u>	10		FAC	
6. <u>Water Hemlock (Ciculata maculata)</u>	5		OBL	
7. <u>Virginia creeper (Parthenocissus quinquefolia)</u>	5		FACU	
8. <u>Sensitive Fern (Onoclea sensibilis)</u>	3		FACW	
9. <u>Spotted joe-pye weed (Eutrochium maculatum)</u>	3		FACW	
10. <u>Hog peanut (Amphicarpaea bracteata)</u>	3		FAC	
11. <u>Christmas Fern (Polystichum acrostichoides)</u>	1		FACU	
100 = Total Cover				
50% of total cover: 50 20% of total cover: 20				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Remarks: (Include photo numbers here or on a separate sheet.)
Prairie Wedgescale (Sphenopholis obtusata var. major)

<p>Dominance Test worksheet:</p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>6</u> (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)</p>	<p>Prevalence Index worksheet:</p> <p>Total % Cover of: _____ Multiply by:</p> <p>OBL species _____ x 1 = _____</p> <p>FACW species _____ x 2 = _____</p> <p>FAC species _____ x 3 = _____</p> <p>FACU species _____ x 4 = _____</p> <p>UPL species _____ x 5 = _____</p> <p>Column Totals: _____ (A) _____ (B)</p> <p>Prevalence Index = B/A = _____</p>
<p>Hydrophytic Vegetation Indicators:</p> <p><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation</p> <p><input checked="" type="checkbox"/> 2 - Dominance Test is >50%</p> <p><input type="checkbox"/> 3 - Prevalence Index is ≤3.0¹</p> <p><input type="checkbox"/> 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)</p> <p><input type="checkbox"/> Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>	
<p>Definitions of Five Vegetation Strata:</p> <p>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).</p> <p>Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.</p> <p>Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.</p> <p>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.</p> <p>Woody vine – All woody vines, regardless of height.</p>	
<p>Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF UT-A City/County: Roane Sampling Date: 6/20/18
 Applicant/Owner: EMDF State: TN Sampling Point: UT-A
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'28.57"N Long: 84°18'24.22"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.66 acre wetland located north of the Haul Road between NT9 and NT10			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> (includes capillary fringe)</p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: seasonally high groundwater table as well as drainage from the Haul Road and the surrounding forest portions of the wetland that are saturated or inundated are sparsely vegetated no clear drainage or tributary channel within the wetland	

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

Sampling Point: UT-A

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Red Maple (<i>Acer rubrum</i>)	20	D	FAC	
2. Sweetgum (<i>Liquidambar styraciflua</i>)	10	D	FAC	
3. Ironwood (<i>Carpinus caroliniana</i>)	10	D	FAC	
4. Green Ash (<i>Fraxinus pennsylvanica</i>)	10	D	FACW	
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				
Sapling Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	20	D	FAC	
2. Alder (<i>Alnus serrulata</i>)	5		OBL	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				
Herb Stratum (Plot size: _____)				
1. Rice Cut Grass (<i>Leersia oryzoides</i>)	20	D	OBL	
2. Trumpet-Creeper (<i>Campsis radicans</i>)	10		FAC	
3. False Nettle (<i>Boehmeria cylindrica</i>)	5		FACW	
4. Jewelweed (<i>Impatiens capensis</i>)	5		FACW	
5. Sensitive Fern (<i>Onoclea sensibilis</i>)	2		FACW	
6. Poison Ivy (<i>Toxicodendron radicans</i>)	20	D	FAC	
7. Virginia-Creeper (<i>Parthenocissus quinquefoli</i>)	5		FACU	
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
50% of total cover: <u>33.5</u> 20% of total cover: <u>13.4</u>				
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: 7 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

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

Tuberled Rein Orchid (*Platanthera flava* var. *herbiola*) mainly in shrubby area at south end

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF UT-B City/County: Roane Sampling Date: 6/20/18
 Applicant/Owner: EMDF State: TN Sampling Point: UT-B
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'25.93"N Long: 84°18'21.38"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.10 acre wetland located just south of the Haul Road			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p>Secondary Indicators (minimum of two required)</p> <table style="width:100%;"> <tr><td><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input checked="" type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td><input checked="" type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>2</u>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks: a seasonally high groundwater table along with drainage from the Haul Road and the surrounding forest wetland forms along a defined drainage channel																																			

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

Sampling Point: UT-B

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Red Maple (<i>Acer rubrum</i>)	50	D	FAC	
2. Tuliptree (<i>Liriodendron tulipifera</i>)	20		FACU	
3. Sweetgum (<i>Liquidambar styraciflua</i>)	10		FAC	
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				
Sapling Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	25	D	FAC	
2. Green Ash (<i>Fraxinus pennsylvanica</i>)	10		FACW	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				
Herb Stratum (Plot size: _____)				
1. Stilt Grass (<i>Microstegium vimineum</i>)	30	D	FAC	
2. Jewelweed (<i>Impatiens capensis</i>)	10	D	FAWW	
3. Leathery Rush (<i>Juncus coriaceus</i>)	10	D	FACW	
4. Hog peanut (<i>Amphicarpaea bracteata</i>)	10	D	FAC	
5. Groundnut (<i>Apios americana</i>)	10	D	FACW	
6. Trumpet-Creeper (<i>Campsis radicans</i>)	10	D	FAC	
7. Cherokee Sedge (<i>Carex cherokeensis</i>)	5		FACW	
8. Water Hemlock (<i>Ciculata maculata</i>)	5		OBL	
9. False Nettle (<i>Boehmeria cylindrica</i>)	5		FACW	
10. Fringed Sedge (<i>Carex crinita</i>)	5		OBL	
11. _____				
_____ = Total Cover				
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF UT-C City/County: Roane Sampling Date: 5/9/18
 Applicant/Owner: EMDF State: TN Sampling Point: 1
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'20.59"N Long: 84°18'21.18"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydic Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.10 acre wetland near mammal plot 14. South of Bear Creek Rd along trib			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p>Secondary Indicators (minimum of two required)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Moss Trim Lines (B16)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Crayfish Burrows (C8)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> Microtopographic Relief (D4)</td> </tr> <tr> <td><input checked="" type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks: The wetland begins along the sparsely vegetated channel before spreading out to include low laying areas dominated by herbaceous vegetation																																			

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

Sampling Point: UT-C

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. American Elm (<i>Ulmus Americana</i>)	20	D	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
<u>Sapling Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Spicebush (<i>Lindera benzoin</i>)	2		FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Herb Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Poison Ivy (<i>Toxicodendron radicans</i>)	30	D	FAC	
2. Stilt Grass (<i>Microstegium vimineum</i>)	30	D	FAC	
3. Frank's Sedge (<i>Carex frankii</i>)	10		OBL	
4. Jewelweed (<i>Impatiens capensis</i>)	10		FACW	
5. Jack-in-the-Pulpit (<i>Arisaema triphyllum</i>)	2		FACW	
6. Tubercled Rein Orchid (<i>Platanthera flava</i> var)	1			
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: <u>41.5</u> 20% of total cover: <u>16.6</u>				
<u>Woody Vine Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

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

most woody vegetation outside of wetland

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT10-A City/County: Roane Sampling Date: 5/9/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT10-A
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'33.88"N Long: 84°18'32.11"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.19 acre wetland located along NT10 near the northern edge of the study area			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Small area with standing water, rest is saturated soil surround creek with water table 0-10 inches below surface.	

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

Sampling Point: NT10-A

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Sweetgum (<i>Liquidambar styraciflua</i>)	10		FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
2. Tuliptree (<i>Liriodendron tulipifera</i>)	5		FACU	
3. _____				
4. _____				
5. _____				
6. _____				
<u>15</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____		20% of total cover: _____		
Sapling Stratum (Plot size: _____)				
1. Green Ash (<i>Fraxinus pennsylvanica</i>)	3		FACW	
2. Pawpaw (<i>Asimina triloba</i>)	2		FAC	
3. Sweetgum (<i>Liquidambar styraciflua</i>)	2		FAC	
4. Flowering Dogwood (<i>Cornus florida</i>)	2		FACU	
<u>9</u> = Total Cover				
50% of total cover: _____		20% of total cover: _____		
Shrub Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____		20% of total cover: _____		
Herb Stratum (Plot size: _____)				
1. Stilt Grass (<i>Microstegium vimineum</i>)	25	D	FAC	
2. Periwinkle (<i>Vinca minor</i>)	25	D	-	
3. Poison Ivy (<i>Toxicodendron radicans</i>)	25	D	FAC	
4. Spotted Lady's-Thumb (<i>Persicaria maculosa</i>)	10		FACW	
5. Stiff Cowbane (<i>Oxypolis rigidior</i>)	2		OBL	
6. Lady Fern (<i>Athyrium asplenioide</i>)	2		FAC	
7. Soft rush (<i>Juncus effusus</i>)	3		FACW	
8. _____				
9. _____				
10. _____				
11. _____				
<u>92</u> = Total Cover				
50% of total cover: <u>46</u>		20% of total cover: <u>18.4</u>		
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____		20% of total cover: _____		
Remarks: (Include photo numbers here or on a separate sheet.) Periwinkle not listed in Wetland Plant List but treating as if not hydrophytic for Dominance Test				

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT10-B City/County: Roane Sampling Date: 5/8/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT10-B
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'24.88"N Long: 84°18'32.25"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.63 acre wetland located north of the Haul Road separated from NT10-A by approximately 650 feet of NT10 that is deeply incised			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: covers a shorter distance along the tributary, is wider, and is wetter when compared to NT9-A, D10W, and NT11-A	

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

Sampling Point: NT10-B

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Red Maple (<i>Acer rubrum</i>)	40	D	FAC	
2. Green Ash (<i>Fraxinus pennsylvanica</i>)	20		FACW	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				
Sapling Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. Sweetgum (<i>Liquidambar styraciflua</i>)	10	D	FAC	
2. Spicebush (<i>Lindera benzoin</i>)	10	D	FAC	
3. Green Ash (<i>Fraxinus pennsylvanica</i>)	10	D	FACW	
4. Ironwood (<i>Carpinus caoliniana</i>)	5		FAC	
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				
Herb Stratum (Plot size: _____)				
1. Poison Ivy (<i>Toxicodendron radicans</i>)	20	D	FAC	
2. Stilt Grass (<i>Microstegium vimineum</i>)	10		FAC	
3. Jewelweed (<i>Impatiens capensis</i>)	15	D	FACW	
4. Cherokee Sedge (<i>Carex cherokeensis</i>)	5		FACW	
5. Sallow Sedge (<i>Carex lurida</i>)	15	D	OBL	
6. Spotted Lady's-Thumb (<i>Persicaria maculosa</i>)	5		FACW	
7. Spike Rush (<i>Eleocharis palustris</i>)	5		OBL	
8. Typha sp	5		OBL	
9. Fringed Sedge (<i>Carex crinita</i>)	10		OBL	
10. Leathery Rush (<i>Juncus coriaceous</i>)	5		FACW	
11. Bulbous Bittercress (<i>Cardamine bulbosa</i>)	3		OBL	
_____ = Total Cover				
50% of total cover: <u>49</u> 20% of total cover: <u>19.6</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Remarks: (Include photo numbers here or on a separate sheet.)
contains Tubercled Rein Orchid (*Platanthera flava* var. *herbiola*) FACW

<p>Dominance Test worksheet:</p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>7</u> (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)</p> <p>Prevalence Index worksheet:</p> <p>Total % Cover of: _____ Multiply by:</p> <p>OBL species _____ x 1 = _____</p> <p>FACW species _____ x 2 = _____</p> <p>FAC species _____ x 3 = _____</p> <p>FACU species _____ x 4 = _____</p> <p>UPL species _____ x 5 = _____</p> <p>Column Totals: _____ (A) _____ (B)</p> <p>Prevalence Index = B/A = _____</p> <p>Hydrophytic Vegetation Indicators:</p> <p><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation</p> <p><input checked="" type="checkbox"/> 2 - Dominance Test is >50%</p> <p><input type="checkbox"/> 3 - Prevalence Index is ≤3.0¹</p> <p><input type="checkbox"/> 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)</p> <p><input type="checkbox"/> Problematic Hydrophytic Vegetation¹ (Explain)</p> <p><small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small></p> <p>Definitions of Five Vegetation Strata:</p> <p>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).</p> <p>Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.</p> <p>Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.</p> <p>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.</p> <p>Woody vine – All woody vines, regardless of height.</p>	<p>Hydrophytic Vegetation Present?</p> <p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
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SOIL

Sampling Point: NT10-B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	2.5Y 6/2	40	5Y 5/2	45				near point 20
			10YR 5/3	10				
			10YR 5/6	5				
0-4	10YR 6/1	35	10YR 4/2	45				second sample within powerline
			10YR 5/6	10				
			10YR 3/1	5				
			10YR 5/1	5				
4-8	Gley1 4/1	100						

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

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148) <input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136) <input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148) <input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148) <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: No Soil Map Unit Data available for this area

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT10-C City/County: Roane Sampling Date: 6/5/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT10-C
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'15.34"N Long: 84°18'25.63"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.68 acre forested wetland south of Bear Creek Road	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>5</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>3</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: wetland begins along the southernmost portion of NT10 before the tributary empties into Bear Creek. This is the wettest portion of the wetland. The wetland then spreads out east and west along the riparian zone of Bear Creek. Drainage patterns and varying degrees of soil moisture have created a wetland with varying wetland characteristics.	

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

Sampling Point: NT10-C

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Sweetgum (Liquidambar styraciflua)</u>	20	D	FAC	
2. <u>Eastern Cottonwood (Populus deltoids)</u> : FAC	5		FAC	
3. <u>Sugar Maple (Acer saccharum)</u>	5		FACU	
4. <u>Redbud (Cercis canadensis)</u>	5		FACU	
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. <u>Spicebush (Lindera benzoin)</u>	20	D	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Sharp-Scale Sedge (Carex oxylepis)</u>	50	D	FACW	
2. <u>Jewelweed (Impatiens capensis)</u>	20		FACW	
3. <u>Poison Ivy (Toxicodendron radicans)</u>	15		FAC	
4. <u>Agrimony (Agrimonia parviflora)</u>	5		FACW	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

Remarks: (Include photo numbers here or on a separate sheet.)
 boundary is difficult to determine. presence of C oxylepis was one of the main determining factors

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF D10W-A City/County: Roane Sampling Date: 5/30/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'31.04"N Long: 84°18'39.47"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.14 acre wetland disconnected from D10W-B by gravel road			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: hydrology comes from D10W, and it widens as it reaches a gravel well access road	

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

Sampling Point: D10W-A

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Sweetgum (<i>Liquidambar styraciflua</i>)	20	D	FAC	
2. Red Maple (<i>Acer rubrum</i>)	20	D	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>				
Sapling Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. Sweetgum (<i>Liquidambar styraciflua</i>)	15	D	FAC	
2. Ironwood (<i>Carpinus caroliniana</i>)	5		FAC	
3. Green Ash (<i>Fraxinus pennsylvanica</i>)	5		FACW	
4. Flowering Dogwood (<i>Cornus florida</i>)	5		FACU	
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Herb Stratum (Plot size: _____)				
1. Poison Ivy (<i>Toxicodendron radicans</i>)	40	D	FAC	
2. Stilt Grass (<i>Microstegium vimineum</i>)	20	D	FAC	
3. Leathery Rush (<i>Juncus coriaceus</i>)	10		FACW	
4. Spotted joe-pye weed (<i>Eutrochium maculatum</i>)	5		FACW	
5. Groundnut (<i>Apios americana</i>)	15		FACW	
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<p>Remarks: (Include photo numbers here or on a separate sheet.)</p>				

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 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF Wetland D10W-B City/County: Roane Sampling Date: 5/13/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'27.28"N Long: 84°18'37.66"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.63 acre wetland located north of the Haul Road and west of the cemetery road.			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input checked="" type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks) 	<p>Secondary Indicators (minimum of two required)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u></p> <p>Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p> <p>Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Iron-oxidizing bacteria present	

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

Sampling Point: D10W-B

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Sweetgum (Liquidambar styraciflua)</u>	20		FAC	
2. <u>Red Maple (Acer rubrum)</u>	40	D	FAC	
3. <u>Black willow (Salix nigra)</u>	20		OBL	
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. <u>Sweetgum (Liquidambar styraciflua)</u>	20	D	FAC	
2. <u>Green ash (Fraxinus pennsylvanica)</u>	20	D	FACW	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>				
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Poison ivy</u>	20	D	FAC	
2. <u>Stiltgrass (Microstegium vimineum)</u>	15	D	FAC	
3. <u>Jewelweed (Impatiens capensis)</u>	15	D	FACW	
4. <u>Fringed sedge (Carex crinita)</u>	15	D	OBL	
5. <u>Tuberled Rein Orchid (Platanthera flava var</u>	10		FACW	
6. <u>Spotted Lady's Thumb (Persicaria maculosa)</u>	15	D	FACW	
7. <u>Marsh Blue Violet (Viola cucullata)</u>	2		FACW	
8. <u>Sensitive Fern (Onoclea sensibilis)</u>	2		FACW	
9. <u>Soft rush (Juncus effusus)</u>	2		FACW	
10. <u>Stiff Cowbane (Oxypolis rigidior)</u>	2		OBL	
11. <u>Bulbous bittercress (Cardamine bulbosa)</u>	2		OBL	
_____ = Total Cover				
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<p>Remarks: (Include photo numbers here or on a separate sheet.)</p> <p>Includes the largest know population of rein orchid on the ORR.</p>				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: UPF W11 City/County: ORNL/Y12 Sampling Date: 7/27/17
 Applicant/Owner: UPF Haul Road Wetland Mitigation State: TN Sampling Point: W11
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'19.11"N Long: 84°18'33.66"W Datum: _____
 Soil Map Unit Name: (not mapped) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Datasheet represent summary of wetland, including hydrology, dominant plants, and soil characteristics. Wetland 11 photos are shown in section 3.5.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) 	Secondary Indicators (minimum of two required) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>31</u> Water Table Present? Yes <input type="checkbox"/> No <input type="checkbox"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input type="checkbox"/> Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: 10% open water Humped bladderwort is the true aquatic plant	

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

Sampling Point: W11

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Herb Stratum</u> (Plot size: _____)				
1. cattail (<i>Typha</i> sp.)	35	+	OBL	
2. Softstem bulrush	35	+	OBL	
3. _____ (<i>Schoenoplectus tabernaemontani</i>)				
4. _____				
5. Other (see remarks)	20			
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
90 = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.) SEE "Vegetation Remarks" on next page...				

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT11-A City/County: Roane Sampling Date: 5/11/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT11-A
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'20.16"N Long: 84°18'49.48"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Remarks: 0.77 acre wetland located north of the Haul Road on the western edge of boundary			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input checked="" type="checkbox"/> High Water Table (A2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input checked="" type="checkbox"/> Geomorphic Position (D2)	
<input checked="" type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
Field Observations:		Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>3</u>		
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0</u>		
Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>0</u>		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: seasonally high groundwater table, periodic overbanking of the tributary, and multiple wet weather conveyances that drain into the ravine variable surface water depending on proximity to tributary and seeps			

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

Sampling Point: NT11-A

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Sweetgum (Liquidambar styraciflua)</u>	30	D	FAC	
2. <u>Red Maple (Acer rubrum)</u>	30	D	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. <u>Sweetgum (Liquidambar styraciflua)</u>	20	D	FAC	
2. <u>Green Ash</u>	20	D	FACW	
3. <u>Flowering Dogwood</u>	3		FACU	
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>21.5</u> 20% of total cover: <u>8.6</u>				
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Poison ivy</u>	20	D	FAC	
2. <u>Stiltgrass (Microstegium vimineum)</u>	15	D	FAC	
3. <u>Jewelweed (Impatiens capensis)</u>	10		FACW	
4. <u>Fringed sedge (Carex crinita)</u>	15	D	OBL	
5. <u>Tuberled Rein Orchid (Platanthera flava var</u>	10		FACW	
6. <u>Spotted Lady's Thumb (Persicaria maculosa)</u>	5		FACW	
7. <u>Marsh Blue Violet (Viola cucullata)</u>	2		FACW	
8. <u>Sensitive Fern (Onoclea sensibilis)</u>	2		FACW	
9. <u>Soft rush (Juncus effusus)</u>	2		FACW	
10. <u>Groundnut (Apios americana)</u>	5		FACW	
11. <u>Frank's Sedge (Carex frankii)</u>	15	D	OBL	
_____ = Total Cover				
50% of total cover: <u>50.5</u> 20% of total cover: <u>20.2</u>				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT11-B City/County: Roane Sampling Date: 6/15/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'12.80"N Long: 84°18'47.13"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 0.77 acre wetland located along NT11 between the Haul Road and Bear Creek Road NT11 is the eastern border of the wetland between points 20 and 1i			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p>Secondary Indicators (minimum of two required)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> </tr> <tr> <td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Moss Trim Lines (B16)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Crayfish Burrows (C8)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> Microtopographic Relief (D4)</td> </tr> <tr> <td><input checked="" type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
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<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input checked="" type="checkbox"/> FAC-Neutral Test (D5)																																			
<p>Field Observations:</p> <table style="width:100%;"> <tr> <td>Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></td> <td>Depth (inches): _____</td> </tr> <tr> <td>Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></td> <td>Depth (inches): <u>5</u></td> </tr> <tr> <td>Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></td> <td>Depth (inches): <u>4</u></td> </tr> </table>	Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>5</u>	Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>4</u>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>																												
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____																																		
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>5</u>																																		
Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): <u>4</u>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks: The wetland follows the tributary becoming narrower and wider based on the surrounding topography.																																			

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

Sampling Point: NT11-B

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Black Willow (<i>Salix nigra</i>)	10		OBL	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. Sweetgum (<i>Liquidambar styraciflua</i>)	15	D	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				
Sapling Stratum (Plot size: _____)				
1. _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. Spicebush (<i>Lindera benzoin</i>)	20	D	FAC	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.
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Herb Stratum (Plot size: _____)				
1. Jewelweed (<i>Impatiens capensis</i>)	30	D	FACW	
2. Spotted Lady's-Thumb (<i>Persicaria maculosa</i>)	20	D	FACW	
3. Agrimony (<i>Agrimonia parviflora</i>)	20	D	FACW	
4. Poison Ivy (<i>Toxicodendron radicans</i>)	15		FAC	
5. Periwinkle (<i>Vinca minor</i>)	5		-	
6. Soft rush (<i>Juncus effusus</i>)	5		FACW	
7. Spotted joe-pye weed (<i>Eutrochium maculatum</i>)	2		FACW	
8. Rose sp.	5		-	
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
50% of total cover: <u>51</u> 20% of total cover: <u>20.4</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.) most woody species outside of wetland				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF NT11-C City/County: Roane Sampling Date: 6/5/18
 Applicant/Owner: EMDF State: TN Sampling Point: NT11-C
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'4.94"N Long: 84°18'48.32"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 1.06 acre wetland located just north of Bear Creek Road on the western edge of the project footprint wetland is bounded by NT11 on the north, by Bear Creek on the east, and by the toe-slope of Bear Creek Road on the south.			

HYDROLOGY

<p>Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)</p>	<p>Secondary Indicators (minimum of two required)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u></p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: wet hydrology from close proximately to Bear Creek and a major tributary drainage from Bear Creek Road and the surrounding forest	

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

Sampling Point: NT11-C

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Red Maple (Acer rubrum)</u>	30	D	FAC	
2. <u>Sweetgum (Liquidambar styraciflua)</u>	25	D	FAC	
3. <u>Sycamore (Platanus occidentalis)</u>	20		FACW	
4. <u>Tuliptree (Liriodendron tulipifera)</u>	10		FACU	
5. _____				
6. _____				
85 = Total Cover				
50% of total cover: 42.5 20% of total cover: 17				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. <u>Spicebush (Lindera benzoin)</u>	40	D	FAC	
2. <u>Silky dogwood (Cornus amomum)</u>	5		FACW	
3. <u>Alder (Alnus serrulata)</u>	5		OBL	
4. <u>Ironwood (Carpinus caoliniana)</u>	10		FAC	
5. <u>Multiflora rose (Rosa multiflora)</u>	3		FACU	
6. _____				
63 = Total Cover				
50% of total cover: 31.5 20% of total cover: 12.6				
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Jewelweed (Impatiens capensis)</u>	20	D	FACW	
2. <u>Stilt Grass (Microstegium vimineum)</u>	10		FAC	
3. <u>Jack-in-the-Pulpit (Arisaema triphyllum)</u>	2		FACW	
4. <u>Virginia chain ern (Woodw ardia virginica)</u>	2		OBL	
5. <u>Cherokee sedge (Carex cherokeensis)</u>	10		FACW	
6. <u>Soft rush (Juncus effusus)</u>	15	D	FACW	
7. <u>Poison Ivy (Toxicodendron radicans)</u>	15	D	FAC	
8. <u>Sharp-scale sedge (Carex oxylepis)</u>	15	D	FACW	
9. <u>Agrimony (Agrimonia parviflora)</u>	5		FACW	
10. <u>Groundnut (Apios americana)</u>	2		FACW	
11. <u>Fringed Sedge (Carex crinita)</u>	2		OBL	
98 = Total Cover				
50% of total cover: 49 20% of total cover: 19.6				
<u>Woody Vine Stratum</u> (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: 7 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

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

Wetland has Tubercled Rein Orchid (Platanthera flava var. herbiola). See more vegetation notes on next page.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: EMDF BCK-A City/County: Roane Sampling Date: 5/29/18
 Applicant/Owner: EMDF State: TN Sampling Point: _____
 Investigator(s): Jamie Herold Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Slope (%): _____
 Subregion (LRR or MLRA): _____ Lat: 35°57'7.30"N Long: 84°18'36.13"W Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: 3.36 acre wetland along Bear Creek multiple beaver dams			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> High Water Table (A2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)
<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)		
<input checked="" type="checkbox"/> Iron Deposits (B5)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input checked="" type="checkbox"/> Water-Stained Leaves (B9)			
<input checked="" type="checkbox"/> Aquatic Fauna (B13)			
Field Observations:		Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>10</u>	Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u>		
Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u>	(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: begins where D10W empties into Bear Creek multiple beaver dams located along Bear Creek that have created the flooded wetland conditions			

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

Sampling Point: BCK-A

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. Sycamore (<i>Platanus occidentalis</i>)	5		FACW	
2. American Elm (<i>Ulmus Americana</i>) FACW	8	D	FACW	
3. Green Ash (<i>Fraxinus pennsylvanica</i>)	8	D	FACW	
4. Pinus sp. (dying)	5		-	
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>13</u> 20% of total cover: <u>3.2</u>				
<u>Sapling Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
<u>Shrub Stratum</u> (Plot size: _____)				
1. Alder (<i>Alnus serrulata</i>)	10	D	OBL	
2. Spicebush (<i>Lindera benzoin</i>)	10	D	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
<u>Herb Stratum</u> (Plot size: _____)				
1. Jewelweed (<i>Impatiens capensis</i>)	25	D	FACW	
2. Stilt Grass (<i>Microstegium vimineum</i>)	10		FAC	
3. Poison Ivy (<i>Toxicodendron radicans</i>)	5		FAC	
4. Frank's Sedge (<i>Carex frankii</i>)	10		OBL	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

Remarks: (Include photo numbers here or on a separate sheet.)
 Open water and bare ground made up approximately 50%. See notes on next page.

APPENDIX C – WETLAND GPS COORDINATES

Wetland	Point Name	Latitude	Longitude
NT9-A			
	1	35.9589041	-84.304388
	2	35.9589452	-84.304399
	3	35.9590301	-84.304330
	4	35.9591160	-84.304276
	5	35.9591603	-84.304209
	6	35.9592154	-84.304227
	7	35.9593801	-84.304170
	8	35.9594472	-84.304108
	9	35.9594440	-84.303997
	10	35.9592866	-84.304055
	11	35.9590995	-84.304059
	1	35.9593542	-84.305131
	2	35.9595394	-84.305302
	3	35.9596965	-84.305405
	4	35.9597300	-84.305493
	5	35.9597706	-84.305605
	6	35.9599005	-84.305725
	7	35.9600864	-84.306027
	9	35.9601510	-84.305866
	10	35.9600754	-84.305807
	11	35.9599775	-84.305609
	12	35.9598722	-84.305386
	13	35.9597105	-84.305343
	14	35.9595882	-84.305202
	15	35.9594842	-84.305126
	16	35.9593924	-84.305077
	17	35.9593619	-84.304990
	18	35.9592980	-84.304867
	19	35.9592424	-84.304838
	20	35.9592293	-84.304786
	21	35.9592194	-84.304682
	22	35.9591775	-84.304661
	23	35.9591532	-84.304560
	24	35.9590733	-84.304512

	25	35.9589526	-84.304523
	26	35.9589357	-84.304447
	27	35.9588333	-84.304614
	28	35.9588701	-84.304667
	29	35.9589329	-84.304755
	30	35.9589908	-84.304843
	31	35.9591876	-84.305005
	32	35.9592869	-84.305104
	Note: eastern fork and western fork numbered separately; point 8 omitted		
NT9-B			
	1	35.9571681	-84.304448
	2	35.9571478	-84.304318
	8	35.9571384	-84.304288
	9	35.9570991	-84.304286
	10	35.9570349	-84.304285
	11	35.9572289	-84.303852
	12	35.9572840	-84.303774
	13	35.9571926	-84.303958
	14	35.9572575	-84.304051
	15	35.9573218	-84.304046
	16	35.9574133	-84.304092
	17	35.9574391	-84.304116
	18	35.9574972	-84.304196
	19	35.9574698	-84.304269
	20	35.9575431	-84.304351
	21	35.9575993	-84.304252
	22	35.9576398	-84.304196
	23	35.9576280	-84.304296
	24	35.9576425	-84.304372
	25	35.9576263	-84.304418
	26	35.9575094	-84.304435
	27	35.9574136	-84.304402
	28	35.9573307	-84.304422
	29	35.9573570	-84.304455
	30	35.9572469	-84.304495
	Note: points 3-7 omitted		
NT9-C			
	1	35.9564932	-84.304452
	2	35.9563926	-84.304362

	3	35.9563280	-84.304375
	4	35.9562931	-84.304281
	5	35.9561800	-84.304247
	6	35.9561114	-84.304119
	7	35.9561582	-84.304072
	8	35.9561886	-84.304069
	9	35.9562619	-84.304059
	10	35.9563347	-84.304130
	11	35.9564256	-84.304158
	12	35.9564907	-84.304165
	13	35.9565744	-84.304189
	14	35.9566339	-84.304201
	15	35.9566719	-84.304237
	16	35.9565713	-84.304471
NT9-D			
	1	35.9557946	-84.304260
	2	35.9557501	-84.304326
	3	35.9557134	-84.304411
	4	35.9556392	-84.304575
	5	35.9556293	-84.304620
	6	35.9555178	-84.304659
	7	35.9554370	-84.304733
	8	35.9554188	-84.304837
	9	35.9553823	-84.304688
	10	35.9553731	-84.304617
	11	35.9554519	-84.304568
	12	35.9555793	-84.304533
	13	35.9556736	-84.304356
	14	35.9556901	-84.304319
	15	35.9557521	-84.304210
	16	35.9558121	-84.304090
	17	35.9559024	-84.303973
	18	35.9559840	-84.304021
	19	35.9560225	-84.304096
	20	35.9559774	-84.304239
	21	35.9559684	-84.304100
	22	35.9558698	-84.304062
UT-A			
	1	35.9575723	-84.306599
	2	35.9576378	-84.306658

	3	35.9577939	-84.306815
	4	35.9578833	-84.306860
	5	35.9580050	-84.306928
	6	35.9580868	-84.306994
	7	35.9581892	-84.306976
	8	35.9582585	-84.307059
	9	35.9584090	-84.307157
	10	35.9584965	-84.307185
	11	35.9585800	-84.307172
	12	35.9585489	-84.307088
	13	35.9584599	-84.306993
	14	35.9583416	-84.306919
	15	35.9582548	-84.306862
	16	35.9581657	-84.306798
	17	35.9580496	-84.306709
	18	35.9579640	-84.306592
	19	35.9578985	-84.306522
	20	35.9578770	-84.306377
	22	35.9578126	-84.306281
	23	35.9577807	-84.306172
	Note: point 21 omitted		
UT-B			
	1	35.9569764	-84.305771
	2	35.9570799	-84.305887
	3	35.9571920	-84.306002
	4	35.9572950	-84.306070
	5	35.9573513	-84.306130
	6	35.9573063	-84.306028
	7	35.9572895	-84.305924
	8	35.9572249	-84.305890
	9	35.9571827	-84.305863
	10	35.9570121	-84.305743
UT-C			
	1	35.9556813	-84.305943
	2	35.9556273	-84.305926
	3	35.9556249	-84.305915
	4	35.9556680	-84.305792
	5	35.9556835	-84.305762
	6	35.9557863	-84.305815
	7	35.9558757	-84.305902

	8	35.9559783	-84.305902
	9	35.9560829	-84.305911
	10	35.9560863	-84.305944
	11	35.9559028	-84.305940
	12	35.9557815	-84.305988
NT10-A			
	1	35.9594222	-84.309054
	2	35.9595714	-84.308985
	3	35.9596603	-84.308869
	4	35.9597298	-84.308775
	5	35.9595705	-84.308762
	6	35.9594709	-84.308796
	7	35.9593506	-84.308854
	8	35.9592980	-84.308980
	9	35.9592969	-84.309032
	10	35.9593258	-84.309077
NT10-B			
	1	35.9563650	-84.308979
	2	35.9565336	-84.308996
	3	35.9566512	-84.309010
	4	35.9567428	-84.309001
	5	35.9568367	-84.309036
	6	35.9568775	-84.309085
	7	35.9569606	-84.309107
	8	35.9570707	-84.309133
	9	35.9571691	-84.309132
	10	35.9573039	-84.309156
	11	35.9573587	-84.309156
	12A	35.9574488	-84.309198
	12B	35.9575580	-84.309232
	12C	35.9576197	-84.309210
	12D	35.9576510	-84.309206
	12E	35.9576132	-84.309124
	12F	35.9575778	-84.309194
	13	35.9574871	-84.309150
	14	35.9574749	-84.309142
	15	35.9573454	-84.309135
	16	35.9573794	-84.309108
	17	35.9573542	-84.309028
	18	35.9572814	-84.308915

	19	35.9571492	-84.308961
	20	35.9571046	-84.308919
	21	35.9570027	-84.308877
	22	35.9568751	-84.308758
	23	35.9567907	-84.308729
	24	35.9567003	-84.308730
	25	35.9565224	-84.308664
NT10-C			
	1	35.9546448	-84.306342
	2	35.9545713	-84.306388
	3	35.9545662	-84.306443
	4	35.9545389	-84.306491
	5	35.9545007	-84.306563
	6	35.9544879	-84.306480
	7	35.9544207	-84.306499
	8	35.9543820	-84.306505
	9	35.9543514	-84.306478
	10	35.9543024	-84.306548
	11	35.9542625	-84.306632
	12	35.9541706	-84.306707
	13	35.9541722	-84.306806
	14	35.9541382	-84.306887
	15	35.9541962	-84.306947
	16	35.9542106	-84.306992
	17	35.9541597	-84.307014
	18	35.9541181	-84.307027
	19	35.9541107	-84.306995
	20	35.9540206	-84.306911
	21	35.9540056	-84.307102
	22	35.9539632	-84.307179
	23	35.9538408	-84.307220
	24	35.9537583	-84.307389
	25	35.9537060	-84.307447
	26	35.9538451	-84.307396
	27	35.9539802	-84.307340
	28	35.9540317	-84.307276
	29	35.9541720	-84.307222
	30	35.9543093	-84.307282
	31	35.9544633	-84.307260
	32	35.9544903	-84.307097

	33	35.9543413	-84.307070
	34	35.9543062	-84.306972
	35	35.9543817	-84.306903
	36	35.9543901	-84.306746
	37	35.9544552	-84.306697
	38	35.9545098	-84.306619
	39	35.9545667	-84.306569
	40	35.9546338	-84.306492
	41	35.9546147	-84.306420
D10W-A			
	1	35.9585449	-84.310747
	2	35.9586702	-84.310934
	3	35.9587923	-84.310992
	4	35.9588825	-84.311026
	5	35.9589535	-84.311100
	6	35.9588938	-84.311148
	7	35.9588259	-84.311101
	8	35.9587663	-84.311100
	9	35.9587037	-84.311056
	10	35.9586157	-84.311034
	11	35.9585041	-84.310947
D10W-B			
	1	35.9579830	-84.310827
	2	35.9579301	-84.310812
	3	35.9579097	-84.310737
	4	35.9578892	-84.310652
	5	35.9578395	-84.310545
	6	35.9578697	-84.310458
	7	35.9578462	-84.310432
	8	35.9578169	-84.310357
	9	35.9577279	-84.310353
	10	35.9576287	-84.310377
	11	35.9575973	-84.310309
	12	35.9575826	-84.310346
	13	35.9575138	-84.310285
	14	35.9574521	-84.310277
	15	35.9573703	-84.310202
	16	35.9572968	-84.310167
	17	35.9572116	-84.310106
	18	35.9570317	-84.310010

	19	35.9569352	-84.309948
	20	35.9566643	-84.309836
	21	35.9565034	-84.309709
	22	35.9564021	-84.309673
	23	35.9563134	-84.309704
	24	35.9562390	-84.309596
	25	35.9561820	-84.309559
	26	35.9560801	-84.309507
	27	35.9560478	-84.309615
	28	35.9560551	-84.309719
	29	35.9561357	-84.309777
	30	35.9561960	-84.309780
	31	35.9562212	-84.309809
	32	35.9562146	-84.309779
	33	35.9563136	-84.309856
	34	35.9564255	-84.309811
	35	35.9566376	-84.309968
	36	35.9568038	-84.309955
	37	35.9569431	-84.310066
	38	35.9570992	-84.310100
	39	35.9571845	-84.310158
	40	35.9572729	-84.310219
	41	35.9573527	-84.310293
	42	35.9573567	-84.310372
	43	35.9574259	-84.310441
	44	35.9575282	-84.310542
	45	35.9576810	-84.310641
	46	35.9578294	-84.310631
	47	35.9578556	-84.310762
	48	35.9578801	-84.310845
	49	35.9579593	-84.310872
	50	35.9580855	-84.311006
	51	35.9581413	-84.310956
	52	35.9581614	-84.310915
	53	35.9581622	-84.310853
	54	35.9581728	-84.310840
	55	35.9581449	-84.310823
	56	35.9581113	-84.310852
	57	35.9580248	-84.310910
UPF W11			

	Note: shape file only		
NT11-A			
	1	35.9561698	-84.313642
	2	35.9561449	-84.313647
	3	35.9560865	-84.313773
	4	35.9561005	-84.313876
	5	35.9561174	-84.313940
	6	35.9560799	-84.313950
	7	35.9560754	-84.313881
	8	35.9560020	-84.313856
	9	35.9559132	-84.313845
	10	35.9558428	-84.313880
	11	35.9557161	-84.313852
	12	35.9556916	-84.313850
	13	35.9555887	-84.313867
	14	35.9554929	-84.313831
	15	35.9554682	-84.313833
	16	35.9554106	-84.313747
	17	35.9553221	-84.313742
	18	35.9552573	-84.313735
	19	35.9551710	-84.313637
	20	35.9550776	-84.313579
	21	35.9549883	-84.313491
	22	35.9549562	-84.313478
	23	35.9549207	-84.313524
	24	35.9548275	-84.313482
	25	35.9547439	-84.313446
	26	35.9546102	-84.313427
	27	35.9545304	-84.313446
	28	35.9544605	-84.313381
	29	35.9544427	-84.313395
	30	35.9544232	-84.313345
	31	35.9543257	-84.313314
	32	35.9542790	-84.313286
	33	35.9542802	-84.313248
	34	35.9543423	-84.313212
	35	35.9543759	-84.313131
	36	35.9543992	-84.313031
	37	35.9544563	-84.313085
	38	35.9545090	-84.313118

	39	35.9545357	-84.313162
	40	35.9546181	-84.313211
	41	35.9546249	-84.313192
	42	35.9547071	-84.313258
	43	35.9547730	-84.313279
	44	35.9547957	-84.313334
	45	35.9548607	-84.313306
	46	35.9549071	-84.313367
	47	35.9549600	-84.313435
	48	35.9550390	-84.313478
	49	35.9550911	-84.313487
	50	35.9551542	-84.313555
	51	35.9552653	-84.313585
	52	35.9553295	-84.313626
	53	35.9553859	-84.313691
	54	35.9554599	-84.313715
	55	35.9555503	-84.313676
	56	35.9555407	-84.313582
	57	35.9556265	-84.313597
	58	35.9556411	-84.313634
	59	35.9557467	-84.313645
	60	35.9557215	-84.313713
	61	35.9557741	-84.313759
	62	35.9558232	-84.313737
	63	35.9558855	-84.313633
	64	35.9559152	-84.313632
	65	35.9559683	-84.313685
	66	35.9560649	-84.313617
	67	35.9561242	-84.313580
NT11-B			
	1I	35.9537219	-84.313069
	1H	35.9536373	-84.312863
	1G	35.9537942	-84.312871
	1F	35.9538957	-84.312751
	1E	35.9540074	-84.312564
	1D	35.9540591	-84.312598
	1C	35.9539504	-84.312828
	1B	35.9540894	-84.312849
	1A	35.9539871	-84.312991
	1	35.9539509	-84.313240

	2	35.9539349	-84.313333
	3	35.9538289	-84.313389
	4	35.9538024	-84.313316
	5	35.9537186	-84.313289
	6	35.9536363	-84.313275
	7	35.9535507	-84.313336
	8	35.9535470	-84.313163
	9	35.9534640	-84.313034
	10	35.9533996	-84.312989
	11	35.9532633	-84.313016
	12	35.9532544	-84.313084
	13	35.9531984	-84.313057
	14	35.9530299	-84.312953
	15	35.9528019	-84.312861
	16	35.9525882	-84.312817
	17	35.9526059	-84.312682
	18	35.9526533	-84.312630
	19	35.9528004	-84.312750
	20	35.9528601	-84.312826
	Note: creek is boundary between points 20 and 11		
NT11-C			
	1	35.9515169	-84.313148
	2	35.9515886	-84.313196
	3	35.9516269	-84.313240
	4	35.9516867	-84.313306
	5	35.9516577	-84.313394
	6	35.9515916	-84.313415
	7	35.9515351	-84.313482
	8	35.9514715	-84.313534
	9	35.9514416	-84.313577
	10	35.9513988	-84.313692
	11	35.9513211	-84.313741
	12	35.9512323	-84.313869
	13	35.9511777	-84.313919
	14	35.9511527	-84.314015
	15	35.9511448	-84.313910
	16	35.9511139	-84.313860
	17	35.9510132	-84.313769
	18	35.9509593	-84.313609

	19	35.9508748	-84.313561
	20	35.9508087	-84.313551
	21	35.9507365	-84.313568
	22	35.9506737	-84.313536
	23	35.9506229	-84.313573
	24	35.9505909	-84.313479
	25	35.9505865	-84.313328
	26	35.9506261	-84.313265
	27	35.9509559	-84.313073
	28	35.9510206	-84.312904
	29	35.9511009	-84.312816
	30 A	35.9510509	-84.313168
	30 B	35.9510849	-84.313386
	30 C	35.9510653	-84.313580
	30 D	35.9512130	-84.313600
	30 E	35.9512412	-84.313529
	31	35.9512538	-84.313424
	32	35.9512900	-84.313349
	33	35.9513926	-84.313264
	34	35.9514270	-84.313188
BCK-A			
	1	35.9530388	-84.308272
	2	35.9530859	-84.308396
	3	35.9530811	-84.308498
	4	35.9530440	-84.308531
	5	35.9529392	-84.308716
	6	35.9529799	-84.308815
	7	35.9529877	-84.308888
	8	35.9528619	-84.309016
	9	35.9527737	-84.309282
	10	35.9526913	-84.309341
	11	35.9525429	-84.309510
	12	35.9524635	-84.309514
	13	35.9523930	-84.309585
	14	35.9523455	-84.309650
	15	35.9523105	-84.309861
	16	35.9522631	-84.309993
	17	35.9522311	-84.310064
	18	35.9522237	-84.310177
	19	35.9522237	-84.310283

	20	35.9521580	-84.310371
	21	35.9520723	-84.310471
	22	35.9520148	-84.310482
	23	35.9519814	-84.310623
	24	35.9519420	-84.310690
	25	35.9519874	-84.310717
	26	35.9519507	-84.310802
	27	35.9520078	-84.310770
	28	35.9520769	-84.310782
	29	35.9520837	-84.310787
	30	35.9521484	-84.310937
	31	35.9521513	-84.310937
	32	35.9521802	-84.310992
	33	35.9520949	-84.310910
	35	35.9520225	-84.310955
	36	35.9520082	-84.310994
	37	35.9519504	-84.311088
	38	35.9518996	-84.311065
	39	35.9518786	-84.311126
	40	35.9518582	-84.311165
	41	35.9518290	-84.311174
	42	35.9518280	-84.311223
	43	35.9517977	-84.311264
	44	35.9517766	-84.311277
	45	35.9517047	-84.311320
	46	35.9516756	-84.311371
	47	35.9516602	-84.311428
	48	35.9516211	-84.311482
	49	35.9515572	-84.311383
	50	35.9515446	-84.311325
	Note: southern boundary in shapefile; point 34 omitted		

APPENDIX D – HYDROLOGIC DETERMINATION FIELD DATA SHEETS

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 13.75)		Absent	Weak	Moderate	Strong
1. Continuous bed and bank		0	1	2	3
2. Sinuous channel		0	1	2	3
3. In-channel structure: riffle-pool sequences		0	1	1.5	2
4. Sorting of soil textures or other substrate		0	1	1.5	2
5. Active/relic floodplain		0	1	2	3
6. Depositional bars or benches		0	1	1.5	2
7. Braided channel		0	1	2	3
8. Recent alluvial deposits		0	0.25	0.5	1
9. Natural levees		0	1	2	3
10. Headcuts		0	1	2	3
11. Grade controls		0	0.5	1	1.5
12. Natural valley or drainageway		0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map		No = 0		Yes = 3	

B. Hydrology (Subtotal = 6.25)		Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel		0	0.5	1	2
15. Water in channel and >48 hours since sig. rain		0	1	2	3
16. Leaf litter in channel (January – September)		1.5	1	0.5	0
17. Sediment on plants or on debris		0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)		0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel		No = 0		Yes = 1.5	

C. Biology (Subtotal = 4.25)		Absent	Weak	Moderate	Strong
20. Fibrous roots in channel ¹		3	2	1	0
21. Rooted plants in channel ¹		3	2	1	0
22. Crayfish in stream (exclude in floodplain)		0	0.25	0.5	1
23. Bivalves/mussels		0	1	2	3
24. Amphibians		0	0.5	1	1.5
25. Macrobenthos (record type & abundance)		0	0.5	1	2
26. Filamentous algae; periphyton		0	1	2	3
27. Iron oxidizing bacteria/fungus		0	0.5	1	1.5
28. Wetland plants in channel ²		0	0.5	1	2

¹ Focus is on the presence of upland plants. ² Focus is on the presence of aquatic or wetland plants.

Total Points = 24.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Defined bed and bank throughout most of the reach. Some sinuosity but not strong.
Slight forming of pool/riffles with some gravel present. Some bedrock grade controls in lower
end. One short section with some braided channel where old logging road crosses valley. Water
standing in pool at culvert but most of reach is dry. This area is characterized by streams with losing
reaches and subsurface flow. Almost no leaf litter in channel, but multiple plants in channel with sediment
on leaves. Numerous fibrous roots growing through channel from surrounding vegetation. Observed
one crayfish in pool and several chimneys along channel. Observed one Gerridae on pool surface.

Hydrologic Determination Field Data Sheet
Tennessee Division of Water Pollution Control, Version 1.4

County: Roane	Named Waterbody: Bear Creek	Date/Time: 2/13/17 0900h
Assessors/Affiliation: Trent Jett, Jamie Herold Oak Ridge National Lab		Project ID :
Site Name/Description: D10W - tributary to Bear Creek		
Site Location: Just west of NT10		
USGS quad: Bethel Valley	HUC (12 digit): 060102070302	Lat/Long: 35.956617 -84.309787
Previous Rainfall (7-days) : 0.74 inches		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown		
Source of recent & seasonal precip data :		
Watershed Size : 0.03 square miles	Photos: Y or N (circle) Number :	
Soil Type(s) / Geology :		Source:
Surrounding Land Use : Forested with two road crossings to south. Some wetlands created in channel.		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) :		
Severe	Moderate	Slight Absent

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except <i>Gambusia</i>)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = Stream
Secondary Indicator Score (if applicable) =

Justification / Notes : Stream is very small but with sustained flows present at time of visit. Well defined channel. Several sections of stream dry where flow goes underground. Heavily forested watershed, but evidence of past logging activities. Observed multiple aquatic invertebrates in D-net samples: Ameletidae (10), Capniidae (8), Limnephilidae (1), Oligochaeta (3), Amphipoda (many), Isopoda (1), Simuliidae (many), Crayfish (2). Note: (values) = individuals not taxa.

APPENDIX E – FOREST INVENTORY TABLES

Table E1. Acreage of land use types within the proposed EMDF site.

Habitat <u>Type</u>	Area (Acres)		
	South of Bear Creek Road	North of Bear Creek Road	Total EMDF Footprint
Forest	33.0	94.4	127.4
Edge	0.0	1.7	1.7
Developed	0.0	10.6	10.6
ROW	4.1	17.2	21.3
Water	0.0	0.2	0.2
EMDF Total	37.1	124.1	161.2

Table E2. List of tree species and live tree basal area statistics in area of proposed EMDF site north of Bear Creek Road.

<u>Scientific Name</u>	<u>Common Name</u>	Basal Area (ft ²)			<u>Merchantable</u>
		Trees (dbh > 10.0 inches)	Saplings (2 > dbh < 10.0 inches)	All tally trees (dbh > 2.0 inches)	
<i>Acer negundo</i>	box elder	18	0	18	
<i>Acer rubrum</i>	red maple	783	765	1,548	249
<i>Acer saccharum</i>	sugar maple	18	18	36	18
<i>Asimina triloba</i>	paw paw	0	18	18	
<i>Carpinus caroliniana</i>	iron wood	0	53	53	
<i>Carya cordiformis</i>	bitternut hickory	18	0	18	18
<i>Carya glabra</i>	pignut hickory	107	53	160	71
<i>Carya pallida</i>	pale hickory	18	0	18	
<i>Carya tomentosa</i>	mockernut hickory	18	53	71	18
<i>Cercis canadensis</i>	redbud	0	18	18	
<i>Cornus florida</i>	flowering dogwood	0	302	302	
<i>Fagus grandifolia</i>	American beech	107	178	285	
<i>Fraxinus sp.</i>	ash	53	53	107	18
<i>Juglans nigra</i>	black walnut	0	18	18	
<i>Juniperus virginiana</i>	red cedar	89	107	196	89
<i>Liquidambar styraciflua</i>	sweetgum	480	694	1,174	302
<i>Liriodendron tulipifera</i>	tulip poplar	1,281	534	1,815	1,068
<i>Nyssa sylvatica</i>	black gum	0	231	231	
<i>Oxydendrum arboreum</i>	sourwood	71	409	480	
<i>Pinus echinata</i>	short-leaf pine	160	0	160	142
<i>Pinus strobus</i>	white pine	125	0	125	125
<i>Pinus taeda</i>	loblolly pine	267	676	943	214

<i>Pinus virginiana</i>	Virginia pine	249	142	391	125
<i>Platanus occidentalis</i>	sycamore	53	0	53	
<i>Prunus serotina</i>	black cherry	71	214	285	18
<i>Quercus alba</i>	white oak	872	214	1,085	712
<i>Quercus coccinea</i>	scarlet oak	36	36	71	18
<i>Quercus falcata</i>	southern red oak	160	89	249	125
<i>Quercus montana</i>	chestnut oak	125	0	125	89
<i>Quercus rubra</i>	northern red oak	214	18	231	142
<i>Quercus stellata</i>	post oak	36	36	71	36
<i>Quercus velutina</i>	black oak	18	0	18	18
<i>Sassafras albidum</i>	sassafras	36	0	36	
<i>Ulmus alata</i>	winged elm	0	53	53	
<i>Ulmus americana</i>	American elm	18	0	18	
<i>Ulmus rubra</i>	slippery elm	0	18	18	
Totals		5,498	5,000	10,498	3,613

Table E3. Genus level live basal area comparison in area of proposed EMDF site north of Bear Creek Road.

Genus	Common Name	Basal Area (sq. ft)			Merchantable basal area	% of Trees BA	% of sapling BA
		Trees (dbh > 10.0 inches)	Saplings (2 > dbh < 10.0 inches)	All tally trees (dbh > 2.0 inches)			
<i>Quercus</i>	oak	1,459	391	1,850	1,139	21.3%	5.7%
	white oak group	1,032	249	1,281	836	15.1%	3.6%
	red oak group	427	142	569	302	6.2%	2.1%
<i>Liriodendron</i>	tulip poplar	1,281	534	1,815	1,068	18.7%	7.8%
<i>Acer</i>	maple	818	783	1,601	267	11.9%	11.4%
<i>Liquidambar</i>	sweet gum	480	694	1,174	302	7.0%	10.1%
<i>Pinus</i>	pine	801	818	1,619	801	11.7%	11.9%
<i>Carya</i>	hickory	160	107	267	107	2.3%	1.6%
<i>Nyssa</i>	black gum	0	231	231		0.0%	3.4%
<i>Prunus</i>	cherry	71	214	285	18	1.0%	3.1%
<i>Oxydendrum</i>	sourwood	71	409	480		1.0%	6.0%
<i>Juniperus</i>	red cedar	89	107	196	89	1.3%	1.6%
<i>Asimina</i>	paw-paw	0	18	18		0.0%	0.3%
<i>Carpinus</i>	ironwood	0	53	53		0.0%	0.8%
<i>Cercis</i>	redbud	0	18	18		0.0%	0.3%
<i>Fagus</i>	beech	53	53	107	18	0.8%	0.8%
<i>Juglans</i>	walnut	0	18	18		0.0%	0.3%
<i>Platanus</i>	sycamore	53	0	53		0.8%	0.0%
<i>Sassafras</i>	sassafras	36	0	36		0.5%	0.0%
<i>Ulmus</i>	elm	17.8	71.2	89.0		0.3%	1.0%
Total		6,850	4,911	11,762	4,948	100%	100%

Table E4. Number of trees and saplings in area of proposed EMDF site north of Bear Creek Road.

Scientific Name	Common Name	Saplings 2				Merchantable Trees	Saplings 2			
		Trees dbh > 10.0 inches	> dbh < 10.0 inches	All tally trees (dbh > 2.0 in)	Merchantable Trees		Trees dbh > 10.0 inches	> dbh < 10.0 inches	All tally trees (dbh > 2.0 inches)	Merchantable Trees
<i>Liriodendron tulipifera</i>	tulip poplar	1,027	3,695	4,722	730	10.7	38.5	49.1	7.6	
<i>Acer rubrum</i>	red maple	814	4,764	5,578	220	8.5	49.6	58.1	2.3	
<i>Liquidambar styraciflua</i>	sweetgum	540	7,018	7,558	321	5.6	73.0	78.7	3.3	
<i>Quercus alba</i>	white oak	533	1,291	1,824	388	5.5	13.4	19.0	4.0	
<i>Pinus virginiana</i>	Virginia pine	243	719	962	111	2.5	7.5	10.0	1.2	
<i>Pinus taeda</i>	loblolly pine	223	5,144	5,367	190	2.3	53.5	55.9	2.0	
<i>Pinus echinata</i>	short-leaf pine	140	0	140	115	1.5	0.0	1.5	1.2	
<i>Quercus falcata</i>	southern red oak	116	1,074	1,190	95	1.2	11.2	12.4	1.0	
<i>Oxydendrum arboreum</i>	sourwood	115	2,431	2,546		1.2	25.3	26.5	0.0	
<i>Fagus grandifolia</i>	American beech	113	1,690	1,803		1.2	17.6	18.8	0.0	
<i>Prunus serotina</i>	black cherry	108	2,702	2,810	12	1.1	28.1	29.2	0.1	
<i>Quercus rubra</i>	northern red oak	108	169	277	80	1.1	1.8	2.9	0.8	
<i>Carya glabra</i>	pignut hickory	99	125	224	72	1.0	1.3	2.3	0.7	
<i>Juniperus virginiana</i>	red cedar	79	720	799	79	0.8	7.5	8.3	0.8	
<i>Pinus strobus</i>	white pine	59	0	59	59	0.6	0.0	0.6	0.6	
<i>Quercus montana</i>	chestnut oak	56	0	56	47	0.6	0.0	0.6	0.5	
<i>Sassafras albidum</i>	sassafras	51	0	51		0.5	0.0	0.5	0.0	
<i>Platanus occidentalis</i>	sycamore	40	0	40		0.4	0.0	0.4	0.0	
<i>Fraxinus sp.</i>	ash	39	160	199	16	0.4	1.7	2.1	0.2	
<i>Acer negundo</i>	box elder	26	0	26		0.3	0.0	0.3	0.0	
<i>Quercus coccinea</i>	scarlet oak	22	277	299	4	0.2	2.9	3.1	0.0	
<i>Quercus stellata</i>	post oak	22	242	264	22	0.2	2.5	2.7	0.2	
<i>Carya cordiformis</i>	bitternut hickory	12	0	12	12	0.1	0.0	0.1	0.1	
<i>Quercus velutina</i>	black oak	11	0	11	11	0.1	0.0	0.1	0.1	
<i>Carya pallida</i>	pale hickory	9	0	9		0.1	0.0	0.1	0.0	
<i>Acer saccharum</i>	sugar maple	7	60	67	7	0.1	0.6	0.7	0.1	
<i>Carya tomentosa</i>	mockernut hickory	7	544	551	7	0.1	5.7	5.7	0.1	
<i>Ulmus americana</i>	American elm	5	0	5		0.1	0.0	0.1	0.0	
<i>Asimina triloba</i>	paw paw	0	194	194		0.0	2.0	2.0	0.0	
<i>Carpinus caroliniana</i>	iron wood	0	836	836		0.0	8.7	8.7	0.0	
<i>Cercis canadensis</i>	redbud	0	52	52		0.0	0.5	0.5	0.0	
<i>Cornus florida</i>	flowering dogwood	0	6,088	6,088		0.0	63.4	63.4	0.0	
<i>Juglans nigra</i>	black walnut	0	39	39		0.0	0.4	0.4	0.0	
<i>Nyssa sylvatica</i>	black gum	0	2,990	2,990		0.0	31.1	31.1	0.0	
<i>Ulmus alata</i>	winged elm	0	622	622		0.0	6.5	6.5	0.0	
<i>Ulmus rubra</i>	slippery elm	0	566	566		0.0	5.9	5.9	0.0	
	Totals	4,624	44,212	48,836	2,598	48.1	460.2	508.3	27.0	

Table E5. Volume of merchantable timber in area of proposed EMDF site north of Bear Creek Road.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Volume (bf)</u>	
		<u>Compartment Total</u>	<u>Average per Acre</u>
<i>Liriodendron tulipifera</i>	tulip poplar	141,237	1,470
<i>Quercus alba</i>	white oak	76,722	799
<i>Liquidambar styraciflua</i>	sweetgum	26,955	281
<i>Acer rubrum</i>	red maple	23,241	242
<i>Pinus echinata</i>	short-leaf pine	19,720	205
<i>Pinus taeda</i>	loblolly pine	19,149	199
<i>Pinus strobus</i>	white pine	17,632	184
<i>Quercus rubra</i>	northern red oak	14,891	155
<i>Pinus virginiana</i>	Virginia pine	13,028	136
<i>Quercus falcata</i>	southern red oak	12,221	127
<i>Quercus montana</i>	chestnut oak	10,522	110
<i>Juniperus virginiana</i>	red cedar	7,156	74
<i>Carya glabra</i>	pignut hickory	6,685	70
<i>Quercus stellata</i>	post oak	3,246	34
<i>Carya cordiformis</i>	bitternut hickory	2,381	25
<i>Carya tomentosa</i>	mockernut hickory	1,957	20
<i>Quercus velutina</i>	black oak	1,851	19
<i>Prunus serotina</i>	black cherry	1,778	19
<i>Quercus coccinea</i>	scarlet oak	1,435	15
<i>Acer saccharum</i>	sugar maple	1,384	14
<i>Fraxinus sp.</i>	ash	1,210	13
	Total	404,401	4,209

Table E6. Genus level merchantable timber rankings in area of proposed EMDF site north of Bear Creek Road.

<u>Genus</u>	<u>Common Name</u>	<u>Volume (bf)</u>
<i>Quercus</i>	oak	120,888
	white oak group	90,490
	red oak group	30,398
<i>Liriodendron</i>	tulip poplar	141,237
<i>Liquidambar</i>	sweet gum	26,955
<i>Acer</i>	maple	24,624
<i>Pinus</i>	pine	69,529
<i>Carya</i>	hickory	11,022
<i>Fraxinus</i>	ash	1,210
<i>Prunus</i>	cherry	1,778
<i>Juniperus</i>	cedar	7,156

Table E7. Largest diameter trees for selected species in area of proposed EMDF site north of Bear Creek Road.

<u>Scientific name</u>	<u>Common Name</u>	<u>dbh of largest tally tree (inches)</u>	<u>Number of tally trees with dbh >= 30.0 inches</u>
<i>Acer negundo</i>	box elder	11.7	
<i>Acer rubrum</i>	red maple	29.9	
<i>Acer saccharum</i>	sugar maple	22.3	
<i>Asimina triloba</i>	paw-paw	4.1	
<i>Carpinus caroliniana</i>	iron wood	6.2	
<i>Carya glabra</i>	pignut hickory	24.9	
<i>Carya cordiformis</i>	bitternut hickory	16.8	
<i>Carya pallida</i>	sand hickory	19.0	
<i>Carya tomentosa</i>	mockernut hickory	20.9	
<i>Cercis canadense</i>	redbud	7.9	
<i>Cornus florida</i>	flowering dogwood	4.8	
<i>Fagus grandifolia</i>	American beech	30.5	1
<i>Fraxinus sp.</i>	ash	18.3	
<i>Juglans nigra</i>	black walnut	9.1	
<i>Juniperis virginiana</i>	eastern red cedar	18.7	
<i>Liquidambar styraciflua</i>	sweetgum	27.4	
<i>Liriodendron tulipifera</i>	tulip poplar	37.4	1
<i>Nyssa sylvatica</i>	black gum	6.0	
<i>Oxydendrum arboreum</i>	sourwood	11.6	
<i>Pinus echinata</i>	short-leaf pine	17.3	
<i>Pinus strobus</i>	white pine	33.2	1
<i>Pinus taeda</i>	loblolly pine	22.9	
<i>Pinus virginiana</i>	Virginia pine	18.7	
<i>Platanus occidentalis</i>	sycamore	32.6	1
<i>Prunus serotina</i>	black cherry	16.2	
<i>Quercus alba</i>	white oak	30.8	3
<i>Quercus coccinea</i>	scarlet oak	29.2	
<i>Quercus falcata</i>	southern red oak	33.8	1
<i>Quercus montana</i>	chestnut oak	38.0	1
<i>Quercus rubra</i>	northern red oak	36.6	1
<i>Quercus stellata</i>	post oak	19.1	
<i>Quercus velutina</i>	black oak	17.0	
<i>Sassafras albidum</i>	sassafras	11.8	
<i>Ulmus alata</i>	winged elm	4.8	
<i>Ulmus americana</i>	American elm	26.8	
<i>Ulmus rubra</i>	slippery elm	2.4	
		Total >= 30.0	10

APPENDIX F – OBSERVED BIRD SPECIES. STATUS AND HABITAT REQUIREMENTS

Common Name	Scientific Name	Reservation Breeding Status	Habitat Requirements
Acadian Flycatcher	<i>Empidonax vireescens</i>	summer resident	mature forest, bottomland forests
American Crow	<i>Corvus brachyrhynchos</i>	year-round resident	forest edge, suburban, urban, pastures, fields
American Goldfinch	<i>Spinus tristis</i>	year-round resident	brushy fields, forest, forest edge, suburban
American Woodcock ^a	<i>Scolopax minor</i>	year-round resident	lowland woodland, marshes, brushy fields
Barred Owl	<i>Strix varia</i>	year-round resident	forest, bottomland woods
Belted Kingfisher	<i>Megaceryle alcyon</i>	year-round resident	creeks, streams; along lake, pond, river edges
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	occasional resident	deciduous and mixed deciduous-coniferous forest
Black-throated Green Warbler	<i>Setophaga virens</i>	summer resident	forest and forest edge
Blue Jay	<i>Cyanocitta cristata</i>	year-round resident	open forest and forest edge; suburban
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	summer resident	forest and forest edge
Blue-headed Vireo	<i>Vireo solitarius</i>	migrant	hardwood forest
Blue-winged Warbler ^a	<i>Vermivora cyanoptera</i>	summer resident	forest edge, shrubby second growth
Brown-headed Cowbird	<i>Molothrus ater</i>	year-round resident	open forest, forest edge, fields, urban, suburban
Carolina Chickadee	<i>Poecile carolinensis</i>	year-round resident	widespread
Carolina Wren	<i>Thryothorus ludovicianus</i>	year-round resident	widespread
Chuck-will's Widow ^a	<i>Antrostomus carolinensis</i>	summer resident	open forested areas; cedar glades
Common Grackle	<i>Quiscalus quiscula</i>	year-round resident	forest edge, second growth, near water
Downy Woodpecker	<i>Picoides pubescens</i>	year-round resident	open hardwood, forest edge, suburban
Eastern Phoebe	<i>Sayornis phoebe</i>	year-round resident	woodland edges, near creek, streams
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	year-round resident	forest edge, shrubby thickets, second growth
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	summer resident	open forested areas

Eastern Wood-Pewee	<i>Contopus virens</i>	summer resident	forest
Field Sparrow	<i>Spizella pusilla</i>	year-round resident	brushy fields
Gray Catbird	<i>Dumetella carolinensis</i>	summer resident	shrubby second growth; forest undergrowth, forest edge
Hooded Warbler	<i>Setophaga citrina</i>	summer resident	hillsides and ravines in mature forest, bottomland hardwood
Indigo Bunting	<i>Passerina cyanea</i>	summer resident	shrubby fields, second growth, forest edge
Kentucky Warbler ^a	<i>Geothlypis formosa</i>	summer resident	mature forest with developed undergrowth
Mourning Dove	<i>Zenaida macroura</i>	year-round resident	fields and open areas, suburban
Northern Cardinal	<i>Cardinalis cardinalis</i>	year-round resident	widespread
Northern Flicker	<i>Colaptes auratus</i>	year-round resident	open forest, forest edge; sometimes agricultural fields
Northern Parula	<i>Setophaga americana</i>	summer resident	wooden swamps, riparian areas in lowland forests
Ovenbird	<i>Seiurus aurocapilla</i>	summer resident	mature hardwood forest
Pileated Woodpecker	<i>Dryocopus pileatus</i>	year-round resident	mature forest
Pine Warbler	<i>Setophaga pinus</i>	year-round resident	coniferous forest, mixed coniferous-deciduous forest
Prairie Warbler	<i>Setophaga discolor</i>	summer resident	shrubby fields, secondary growth
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	year-round resident	forest
Red-eyed Vireo	<i>Vireo olivaceus</i>	summer resident	hardwood forest
Red-shouldered Hawk	<i>Buteo lineatus</i>	year-round resident	forest and forest edge
Red-tailed Hawk	<i>Buteo jamaicensis</i>	year-round resident	open field and forest edge
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	summer resident	open hardwood, forest edge, suburban
Scarlet Tanager	<i>Piranga olivacea</i>	summer resident	mature hardwood forest
Eastern Screech Owl	<i>Megascops asio</i>	year-round resident	forest
Summer Tanager	<i>Piranga rubra</i>	summer resident	deciduous and mixed forest, forest edge
Swainson's Thrush	<i>Catharus ustulatus</i>	migrant	forest and forest edge
Tufted Titmouse	<i>Baeolophus bicolor</i>	year-round resident	widespread
Turkey Vulture	<i>Cathartes aura</i>	year-round resident	open areas, wooded areas, urban, suburban
White-breasted Nuthatch	<i>Sitta carolinensis</i>	year-round resident	hardwood forest and forest edge
White-eyed Vireo	<i>Vireo griseus</i>	summer resident	forest edges, dense forest undergrowth

Wild Turkey	<i>Meleagris gallopavo</i>	year-round resident	open forest and adjacent clearings
Wood Thrush ^{a,b}	<i>Hylochichla mustelina</i>	summer resident	usually relatively mature forest
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	summer resident	woodland edges, river bottoms, hedgerows
Yellow-breasted Chat	<i>Icteria virens</i>	summer resident	shrubby fields, secondary growth
Yellow-rumped Warbler	<i>Setophaga coronata</i>	winter resident	forest and forest edge
Yellow-throated Vireo	<i>Vireo flavifrons</i>	summer resident	hardwood forest
Yellow-throated Warbler	<i>Setophaga dominica</i>	summer resident	forest and forest edge (usually riparian)

^a Listed by U. S. Fish and Wildlife Service as Bird of Management Concern

^b Listed by State of Tennessee as In Need of Management