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

Army Corps of Engineers
Bear Creek
Facultative
Facultative Upland
Facultative Wetland
Obligate Wetland
Oak Ridge Reservation
Pinhook Branch
Tennessee Department of Environment and Conservation
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 tenneesseensis*) – 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 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 proximately 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 needs from dying pine trees that cannot tolerate the waterlogged soil.



Figure 3. Map of 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

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

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

<u>NT11</u>

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.

<u>NT10</u>

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).

<u>NT9</u>

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.

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

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.

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 <= dbh <= 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, 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 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

Tubercled 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 tubercled rein orchid on the ORR, and are also considered a large populations for the state of Tennessee as a whole.

In addition to the Tubercled 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.

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

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

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

Survey	Nights	Site ID	Lat.	Long.	Site Description
Start Date	deployed				
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.

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

Table 6. Observed mammals and their habitat requirements.

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.

Reptiles and Amphibians	Habitat Requirements
American Toad (Anaxyrus americanus)	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 (Desmognathus fuscus)	streams and seepage areas
Gray Treefrog (Hyla versicolor)	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</i> palustris)	cool wooded streams, creeks, and springs
Eastern Black Kingsnake (Lampropeltis nigra)	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</i> spiloides)	woodlands, fields edges, near streams, farms, and suburban
Plestiodon spp. (skink)	variable woodland areas

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

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.

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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 A- RARE SPECIES SURVEY POINT COORDINATES

APPENDIX B –WETLAND DETERMINATION DATA FORMS

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°57'3	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 signific	antly disturbed? Are "Normal Circumstances" present? Yes 🖌 No
Are Vegetation Soil , or Hydrology natural	ly problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map show	ving sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes ✓ No Hydric Soil Present? Yes ✓ No Wetland Hydrology Present? Yes ✓ No Remarks:	Is the Sampled Area within a Wetland? Yes Ves No
0.92 acre wetland located north of the Haul Road	
This wetland contains two community types: palustri	ine forested and palustrine emergent. The forested community is
located along most of NT9 until it reaches the previo	pusly cleared powerline and become an emergent community. The
finger to the east is also an emergent community.	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that ap	oply) Surface Soil Cracks (B6)
Surface Water (A1)	atic Plants (B14) 🗹 Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	Sulfide Odor (C1)
Saturation (A3)	Rhizospheres on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1)	of Reduced Iron (C4) Dry-Season Water Table (C2)
Sediment Deposits (B2)	Surface (C7)
Algal Mat or Crust (B4)	Solution Visible of Aerial Integery (C9)
I algar Mat of Clust (b4) □ Other (E4)	
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes 🖌 No 💭 Depth (inc	ches): <u>1</u> _
Water Table Present? Yes 🗹 No 🛄 Depth (in	ches): 0
Saturation Present? Yes 🖌 No 💭 Depth (inc	ches): 0 Wetland Hydrology Present? Yes ✓ No
(includes capillary fringe)	nhotos, pravious inspections), if available:
Bessies recorded bata (second gauge, monitoring well, defidi j	proces, procession inspections), in contraster
Remarks:	
forms along the two forks of NT9	
majority of NT9-A forms a long narrow wetland along	g the western fork, but a small finger extends following a short
segment of the eastern fork	
variable surface water depending on proximity to str	eams, seeps and drainages

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VEGETATION (Five Strata) – Use scientific na	ames of	plants.		Sampling Point: NT9-A
	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species
1. Red Maple (Acer rubrum)	10		FAC	That Are OBL, FACW, or FAC: 6 (A)
2. Sweetgum (Liquidambar styraciflua)	10		FAC	Tatal Month on of Damin and
3. Black Willow (Salix nigra)	15	D	OBL	Species Across All Strata: 6 (B)
A American Elm (Ulmus Americana)	15	D	FACW	
Green Ash (Fraxinus pennsylvanica)	10		FACW	Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100 (A/B)
<u>b.</u>	60			Prevalence Index worksheet:
	00	= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: <u>30</u>	20% of	total cover:	12	
Sapling Stratum (Plot size:)				
1.				FACW species X 2 =
2	2			FAC species x 3 =
3	·			FACU species x 4 =
3			in an	UPL species x 5 =
4	÷		<u> </u>	Column Totals: (A) (B)
5				
6				Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
50% of total cover:	20% of	total cover-		1 - Rapid Test for Hydrophytic Vegetation
Chauth Stratume (Diet size:		total cover.		2 - Dominance Test is >50%
Shirub Stratum (Piol Size:)	10		FAC	3 Prevalence Index is $\leq 3.0^{1}$
		D	FACIAL	4 Membelogical Adoptetions ¹ (Dravide supporting
2. Green Asir (Fraxinus peninsylvanica)	20	<u> </u>	FACVV	data in Remarks or on a separate sheet)
3	<u> </u>			Problematic Hydrophytic Vegetation ¹ (Explain)
4	<u> </u>			
5				
6.				Indicators of hydric soil and wetland hydrology must
	30	= Total Cov	er	Definitions of Fire Vegetation Strate.
50% strail			6	Deminuons of Five vegetation Strata:
50% of total cover: 10	20% 01	total cover:	<u> </u>	Tree – Woody plants, excluding woody vines,
Herb Stratum (Plot size:)	05	-		approximately 20 ft (6 m) or more in height and 3 in.
1. Jewelweed (Impatiens capensis)	25	<u> </u>	FACVV	(7.6 cm) or larger in diameter at breast height (DBH).
2. Hog peanut (Amphicarpaea bracteata)	15	<u> </u>	FAC	Sapling – Woody plants, excluding woody vines,
3. Poison Ivy (Toxicodendron radicans)	15	<u>D</u>	FAC	approximately 20 ft (6 m) or more in height and less
4. Fringed Sedge (Carex crinita)	10		OBL	than 3 in. (7.6 cm) DBH.
5. Spike Rush (Eleocharis palustris)	10		OBL	Shrub – Woody plants, excluding woody vines,
6 Stilt Grass (Microstegium vimineum)	10		FAC	approximately 3 to 20 ft (1 to 6 m) in height.
7 Poalsp	10		-	Usek All hash seen us (new useds) plants including
 Water Hemlock (Ciculata maculata) 	2		OBL	herbaceous vines regardless of size, and woody
Stiff Cowbano (Ovupolic rigidior)	2			plants, except woody vines, less than approximately 3
Tuberaled Bein Orabid (Distanthere flave ve	4			ft (1 m) in height.
10, Tubercied Rein Orchid (Platanthera nava va			FACVV	Woody vine - All woody vines regardless of height
11				troody the stat woody thes, regulatess of height.
	100	= Total Cov	er	
50% of total cover: 50	20% of	total cover:	20	
Woody Vine Stratum (Plot size:			;;	
1				
u			<u> </u>	
2				
<u>ئ</u>	×	·		
4	,			
5	<u> </u>			Hydrophytic
		= Total Cov	er	Vegetation
50% of total cover:	20% of	total cover-		Present? Yes 🖌 No
Demarke: (include photo pumbers here at an a commente		total covel.		
Remarks: (include proto numbers here or on a separate s	neet.)			
				Freezen Manuschington (Diet and - Manusching - A
US Army Corps of Engineers				Eastern wountains and Pledmont – Version 2.0

Sampling Point: NT9-A SOIL Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Matrix Redox Features Color (moist) Color (moist) Loc² Texture Remarks Type¹ (inches 7.5YR 5/1 60 40 SiL 0-4 7.5YR 5/6 С Μ -emergent community near 4-12 2.5Y 5/1 98 7.5Y 5/6 2 С Μ 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 С SiL M from flag 18 10YR 5/8 SiL 20 SiL 10YR 6/1 55 4-8 10YR 5/8 45 С Μ 8-12 10YR 6/1 60 10YR 6/6 40 SiL С М ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains ²Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators: Indicators for Problematic Hydric Soils³: Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Black Histic (A3) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Piedmont Floodplain Soils (F19) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Stratified Layers (A5) 2 cm Muck (A10) (LRR N) ✓ Depleted Matrix (F3)
 ✓ Redox Dark Surface (F6) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Depleted Dark Surface (F7)
Redox Depressions (F8) Depleted Below Dark Surface (A11)
Thick Dark Surface (A12) Dther (Explain in Remarks) Redox Depressions (F8) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, MLRA 147, 148) MLRA 136) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³Indicators of hydrophytic vegetation and Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be present, Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) unless disturbed or problematic. Restrictive Layer (if observed): Type: Yes 🗸 Hydric Soil Present? No L Depth (inches): Remarks: No Soil Map Unit Data available for this area

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Project/Site: EMDF NT9-B	City/County: Roa	ne	Sampling Date: 6/15/18
Applicant/Owner: EMDF	0.0,000.00,0	State: TN	Sampling Point: NT9-B
Investigator(s): Jamie Herold	Section, Township	, Range:	
Landform (hillslope, terrace, etc.): Terrace	Local relief (concave,	convex, none): level/conc	ave Slope (%):
Subregion (LRR or MLRA): Lat	t: 35°57'26.27''N	Long: 84°18'15.30'W	Datum:
Soil Map Unit Name:	-	NWI classifie	cation:
Are climatic / hydrologic conditions on the site typical f	for this time of year? Yes 🚺 I	Jo 🔲 (If no, explain in F	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 answe	ers in Remarks.)
SUMMARY OF FINDINGS – Attach site n	nap showing sampling poi	nt locations, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes Hydric Soil Present? Yes Wetland Hydrology Present? Yes	No Is the Sam within a W	pled Area etland? Yes 🗹	No
Remarks:			
0.41 acre wetland located north of Bear Cr	eek Road along the east sid	e of NT9	
HYDROLOGY			
Wetland Hydrology Indicators:	1	Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required; check	ck all that apply)	Surface Soil	Cracks (Bb)
✓ Surface Water (A1)	I True Aquatic Plants (B14)	Sparsely Ve	getated Concave Surface (B8)
✓ Flight Water Table (A2)	Ovidized Phizospheres on Living	Poots (C3) Moss Trim L	ines (B16)
Water Marks (B1)	Presence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction in Tilled Sc	ils (C6) Cravfish Bur	TOWS (C8)
Drift Deposits (B3)	Thin Muck Surface (C7)	Saturation V	isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)	Stunted or S	Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	Position (D2)
Inundation Visible on Aerial Imagery (B7)		🗖 Shallow Aqu	iitard (D3)
Water-Stained Leaves (B9)		Microtopogra	aphic Relief (D4)
Aquatic Fauna (B13)		✓ FAC-Neutral	l Test (D5)
Field Observations:			
Surface Water Present? Yes No 🗹	Depth (inches):		
Water Table Present? Yes 🗹 No	Depth (inches): 4		
Saturation Present? Yes 🖌 No	Depth (inches): 0	Wetland Hydrology Preser	nt? Yes 🖌 No 🔄
(includes capillary tringe) Describe Recorded Data (stream gauge, monitoring)	well, aerial photos, previous inspec	tions), if available:	
Remarks:			
surface depressions and drainage patterns	5		
seasonably high ground water table and w	ater flow over the ground su	face	

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	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species
1. Sweetgum (Liquidambar styraciflua)	10		FAC	That Are OBL, FACW, or FAC: 6 (A)
2. Sycamore (Platanus occidentalis)	20	D	FACW	Tatal Number of Dominant
3. Green Ash (Fraxinus pennsylvanica)	20	D	FACW	Species Across All Strata: 6 (B)
4. Red Maple (Acer rubrum)	20	D	FAC	
5. Red cedar (Juniperus virginiana)	5		FACU	Percent of Dominant Species
<u>.</u>			100	
3	75	= Total Cov	er	Prevalence Index worksheet:
5.00% offetel equary 37.5		total aguan	15	Total % Cover of: Multiply by:
So% of total cover: 07.0	20% 01	total cover:	10	OBL species x 1 =
Elowering Dogwood (Corpus florida)	5		FACU	FACW species x 2 =
	<u> </u>		1400	FAC species x 3 =
				FACU species x 4 =
				UPL species x 5 =
				Column Totals: (A) (B)
				Discoverse reconsiderer
·				Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
Shrub Stratum (Plot size:)				✓ 2 - Dominance Test is >50%
Spicebush (Lindera benzoin)	30	D	FAC	3 - Prevalence Index is ≤3.0 ¹
Sweetgum (Liquidambar styraciflua)	10		FAC	4 - Morphological Adaptations ¹ (Provide supportir
3				data in Remarks or on a separate sheet)
· <u>;</u>				Problematic Hydrophytic Vegetation ¹ (Explain)
				<i>a</i>
				¹ Indicators of hydric soil and wetland hydrology must
	40	Total Cov		be present, unless disturbed or problematic.
20			0	Definitions of Five Vegetation Strata:
50% of total cover: 20	20% of	total cover:	8	Tree – Woody plants, excluding woody vines,
Herb Stratum (Plot size:)		-		approximately 20 ft (6 m) or more in height and 3 in.
Cherokee Sedge (Carex cherokeensis)	30	<u> </u>	FACW	(7.6 cm) or larger in diameter at breast height (DBH).
I ubercied Rein Orchid (Platanthera flava var	20	<u> </u>	FACW	Sapling – Woody plants, excluding woody vines,
Jewelweed (Impatiens capensis)	15		FACW	approximately 20 ft (6 m) or more in height and less
Spike Rush (Eleocharis palustris)	10		OBL	
, Hog peanut (Amphicarpaea bracteata)	10		FAC	Shrub – Woody plants, excluding woody vines,
, Fringed Sedge (Carex crinita)	5		OBL	approximately 3 to 20 ft (1 to 6 m) in height.
Frank's Sedge (Carex frankii)	2		OBL	Herb – All herbaceous (non-woody) plants, including
3. Water Hemlock (Ciculata maculata)	2		OBL	herbaceous vines, regardless of size, and woody
Stiff Cowbane (Oxypolis rigidior)	2		OBL	plants, except woody vines, less than approximately . If (1 m) in height
0				
1.				Woody vine – All woody vines, regardless of height.
	96	= Total Cov	er	
COV of total agreen 48	200/ -6	total anuan	19.2	
50% of total cover:	20% 01	total cover:	10.2	
voody vine Stratum (Piot size:)				
·				
				Hydrophytic
	i	= Total Cov	er	Vegetation
50% of total cover:	20% of	total cover:	n	Present? Yes Ves No
Remarks: (Include photo numbers here or on a separate s	heet.)			

-		-	- N IT	го	
Samn	lina	Point	IN	13-	ப

SOIL							Sampling Point: 19-8
Profile Des	cription: (Describe	to the dep	oth needed to docu	ment the indicate	or or confirm	n the absence of	indicators.)
Depth	Matrix		Redo	ox Features			
(inches)	Color (moist)	%	Color (moist)	% Type	¹ Loc ²	Texture	Remarks
0-4	7.5Y 5/2	60	7.5Y 4/2	40			
410	10/0 6/0		10/0 5/0		_		
4-12	101R 0/2	0	101R 5/2			<u></u>	
	7 W.						
-	6 8	-		· · · · ·			
	a <u>e</u>						
-							
×	o e			· · · · · · · · · · · · · · · · · · ·		<u> </u>	
÷	8 #		3	· · · · · · · · · · · · · · · · · · ·		<u> </u>	
	al - ar			. <u> </u>			
¹ Type: C=C	Concentration D=De	nletion RM	=Reduced Matrix M	S=Masked Sand	Grains	² Location: PL=E	Pore Lining M=Matrix
Hydric Soil	Indicators:		Troduced mainly m	e masked cana	or dirito.	Indicator	s for Problematic Hydric Soils ³ :
Histoso			Dark Surface	o (S7)			Muck (A10) (MI DA 147)
	ninodon (A2)			olow Surfaco (S8)	(MI DA 147	149)	t Drairia Daday (A16)
	listic (A3)		Thin Dark Si	urface (S9) (MLR	(INCICA 147,	, 140) 🗖 Coas	
	en Sulfide (A4)			ed Matrix (F2)	,		mont Floodplain Soils (F19)
Stratifie	d Lavers (A5)		Depleted Ma	atrix (F3)		(M	ILRA 136, 147)
2 cm M	uck (A10) (LRR N)		Redox Dark	Surface (F6)		U Very	Shallow Dark Surface (TF12)
Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	irk Surface (F7)		D Othe	r (Explain in Remarks)
🔲 Thick D	ark Surface (A12)		🔲 Redox Depr	essions (F8)			
🔲 Sandy I	Mucky Mineral (S1) ((LRR N,	Iron-Mangar	nese Masses (F12) (LRR N,		
MLR	A 147, 148)		MLRA 13	36)			
Sandy (Gleyed Matrix (S4)		Umbric Surfa	ace (F13) (MLRA	136, 122)	³ Indicat	ors of hydrophytic vegetation and
Sandy I	Redox (S5)		Piedmont Fl	oodplain Soils (F1	9) (MLRA 14	48) wetlar	nd hydrology must be present,
Stripped	d Matrix (S6)		Red Parent	Material (F21) (MI	_RA 127, 14	7) unless	s disturbed or problematic.
Restrictive	Layer (if observed)):					
Туре:	10 W						
Depth (ir	nches):					Hydric Soil Pre	esent? Yes 🔽 No 🗔
Remarks:	. Sectore et alle	and the second second	f 0		. O 1		
0	+ inches of soil v	with value	es of 6 of more a	ind chromas o	12011, 10	concentration	srequired
N	la Cail Man I Init	Dete ave	ilabla far this ar				
IN	io Soli Map Unit	Data ava	liable for this are	ea			

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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	3.08''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	f year? Yes 🗸 No 🦳 (If no, explain in Remarks.)
Are Vegetation Soil , or Hydrology significant	ntly 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 showi	ng sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes 🗸 No	le the Sempled Area
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes Ves
Wetland Hydrology Present? Yes Ves	
Remarks:	
0.28 acre wetland located along wetland NT9 on the	south side of Bear Creek Road
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that app	ly) 🔲 Surface Soil Cracks (B6)
Surface Water (A1)	c Plants (B14) Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	ulfide Odor (C1)
Saturation (A3)	izospheres on Living Roots (C3) 🔲 Moss Trim Lines (B16)
Water Marks (B1)	Reduced Iron (C4) Dry-Season Water Table (C2)
Sediment Deposits (B2)	Reduction in Tilled Soils (C6) 🗹 Crayfish Burrows (C8)
Drift Deposits (B3)	Surface (C7)
Algal Mat or Crust (B4) Other (Expla	ain in Remarks) 🛛 🗹 Stunted or Stressed Plants (D1)
Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	. 1
Surface Water Present? Yes No Depth (inch	nes): 1
Water Table Present? Yes Yes No Depth (inch	$\frac{4}{2}$
Saturation Present? Yes Ves Depth (inch	nes): U Wetland Hydrology Present? Yes V No
Describe Recorded Data (stream gauge, monitoring well, aerial ph	notos, previous inspections), if available:
Remarks:	
High ground water table, periodic over banking of NT	9, and drainage from Bear Creek Road and the surrounding forest
Surface water was present throughout much of the ar	ea after multiple days of heavy rain, but water only remained in
micro depressions by the following week when the sit	e was revisited. Other hydrology indicators included wet leaves,
drainage patterns could be seen throughout the world	as at 5-4 mones the week after the major ram event. Multiple
the heaviest water flow likely occurs during storm ever	and, mere are small sections of sparsely vegetated ground where
	4 HQ.

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			2 42 5		
Tree Stratum (Plot size:	Absolute % Cover	Dominant Species?	Indicator	Dominance Test worksheet:	
1. Red Maple (Acer rubrum)	30	D	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: 4	(A)
2. Sycamore (Platanus occidentalis)	5		FACW	Total Number of Dominant	
3				Species Across All Strata: 4	(B)
4				Demonst of Deminant Creation	
5				That Are OBL, FACW, or FAC: 100	(A/B
õ					
	35	= Total Cov	er	Prevalence Index worksheet:	
50% of total cover: 17.5	20% of	total cover-	7	Total % Cover of:Multiply I	<u>. vc</u>
Sapling Stratum (Plot size:				OBL species x 1 =	
Ironwood (Carpinus caoliniana)	3		FAC	FACW species x 2 =	
Sweetoum (Liquidambar styraciflua)	1		FAC	FAC species x 3 =	
	<u> </u>		<u></u>	FACU species x 4 =	
»				UPL species x 5 =	
4				Column Totals: (A)	(B)
			· <u> </u>		
ò				Prevalence Index = B/A =	
	4	= Total Cov	er	Hydrophytic Vegetation Indicators:	
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetati	ion
Shrub Stratum (Plot size:)				✓ 2 - Dominance Test is >50%	
1. Spicebush (Lindera benzoin)	50	D	FAC	3 - Prevalence Index is ≤3.0 ¹	
2. Alder (Alnus serrulata)	10		OBL	4 - Morphological Adaptations ¹ (Provide	e supportin
3 Ironwood (Carpinus caoliniana)	5		FAC	data in Remarks or on a separate sl	neet)
1 Sweetgum (Liquidambar styraciflua)	5		FAC	Problematic Hydrophytic Vegetation ¹ (E	Explain)
5 Privet (Ligustrum japonicum)	1		UPL		
Red cedar (Juniperus virginiana)	1		FACU	¹ Indicators of hydric soil and wetland hydrol	logy must
). <u></u>	72	Total Cav		be present, unless disturbed or problematic	5
20				Definitions of Five Vegetation Strata:	
50% of total cover: 30	20% of	total cover:	14.4	Tree – Woody plants, excluding woody vine	es,
Herb Stratum (Plot size:)		_		approximately 20 ft (6 m) or more in height	and 3 in.
I. Jewelweed (Impatiens capensis)	40	<u> </u>	FACW	(7.6 cm) or larger in diameter at breast heig	jht (DBH).
2. Poison Ivy (Toxicodendron radicans)	25	<u> </u>	FAC	Sapling – Woody plants, excluding woody	vines,
3. Soft rush (Juncus effusus)	10		FACW	approximately 20 ft (6 m) or more in height	and less
A. Stilt Grass (Microstegium vimineum)	10		FAC	than 3 m. (7.6 cm) DBH.	
5. Spotted joe-pye weed (Eutrochium maculatu	3		FACW	Shrub – Woody plants, excluding woody vi	nes,
5. Virginia creeper (Parthenocissus quinquefolia	3		FACU	approximately 3 to 20 ft (1 to 6 m) in height	•
Hog peanut (Amphicarpaea bracteata)	2		FAC	Herb – All herbaceous (non-woody) plants.	including
Wild yam (Dioscorea villosa)	2		FAC	herbaceous vines, regardless of size, and v	voody
Muscadine (Vitis rotundifolia)	1		FAC	plants, except woody vines, less than appro	ximately 3
n Strawberrybush (Euonymus americanus)	1	2	FAC	n (Thi) in height.	
1				Woody vine – All woody vines, regardless	of height.
··	97	Total Cav			
40 E					
50% of total cover: 40.0	20% of	total cover:	19.4		
Voody Vine Stratum (Plot size:)					
1					
2					
3					
i					
5					
5		= Total Cov	er	Vegetation	-
		NORMAL PROPERTY	2003	Present? Ves V	
EOO/ afteral agues	200/ -5	total course			

			n n
Comp	lina	Doint	9-67
Janno	III IU	FUIL.	

Profile Desc	cription: (Describe	to the de	oth needed to docu	mont the	indicator	or confirm	n the absence	of indicator	re)	
Denth	Matrix	to the de	Rede	ny Feature	inuicator s	or comm	n ule absence		5.)	
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	-	Remarks	
0-4	10YR 4/2	100	10YR 5/6	5	С	M	С			
4-9	10YR 5/3	90	10YR 5/6	5	С		5	10		
			10YR 4/2	5	-			-		
9-11	2.5YR 6/1	98	10YR 5/6	2	<u> </u>	~~ <u>~</u> ~~~	<u> </u>	×		
<u></u>	2.011(0/1		1011(0/0		<u> </u>		<u> </u>	-		
	8 6.									
	6 w									
	5 <u>6</u>						<u>.</u>	<u>.</u>		
						127				
	51 M					1.00				
Type: C=C	oncentration D=Der	letion RM		S=Masker	d Sand Gr	ains	² Location: P	=Pore Linin	n M=Matrix	
Hydric Soil	Indicators:	Jeaon, rav		0-Indokes		unis.	Indica	ators for Pro	oblematic Hy	dric Soils ³ :
📕 Histosol	(A1)		Dark Surface	e (S7)			 2	cm Muck (A	10) (MLRA 14	47)
Histic Ep	pipedon (A2)		🔲 Polyvalue Be	elow Surfa	ice (S8) (1	ILRA 147,	, 148) 🔲 C	oast Prairie	Redox (A16)	
Black Hi	istic (A3)		Thin Dark Su	urface (S9) (MLRA	147, 148)	-	(MLRA 147	7, 148)	1-11-11-11-12-1
Hydroge	en Sulfide (A4)		Loamy Gleye	ed Matrix	(F2)		L P	iedmont Flo	odplain Soils (F19)
2 cm Mi	u Layers (A5) uck (A10) (I RR N)		Redox Dark	surface (I	-6)		Πv	erv Shallow), 147) Dark Surface	(TE12)
Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	e (F7)			ther (Explain	n in Remarks)	(11.12)
Thick Da	ark Surface (A12)		Redox Depre	essions (F	8)					
Sandy M	Aucky Mineral (S1) (LRR N,	Iron-Mangar	iese Mass	es (F12) ((LRR N,				
	A 147, 148)		MLRA 13	86)		122	31	instant of his	ala a a la cati a la cata	at at a state of the second
Sandy E	Sedox (S5)		Piedmont Fl	ace (F13) nodplain S	(WILKA I. Soils (E19)	(MIRA 14	48) we	tland hydroli	arophyuc vegi hav must he n	resent
Carray	todon (co)			oouprante	10110 (1 10)	(inclusion i		a and ny a on	ogj maor bo p	i o o o i icy
Stripped	l Matrix (S6)		Red Parent I	Material (F	21) (MLF	A 127, 14	7) un	less disturbe	d or problema	atic.
Stripped Restrictive	l Matrix (S6) Layer (if observed)	:	Red Parent I	Material (F	21) (MLF	RA 127, 14	7) un	less disturbe	d or problema	itic.
Stripped Restrictive	l Matrix (S6) Layer (if observed)	:	Red Parent I	Material (F	21) (ML F	2A 127, 14	7) un	less disturbe	ed or problema	
Stripped Restrictive Type: Depth (in	l Matrix (S6) Layer (if observed) ches):	:	Red Parent I	Material (F	21) (ML F	2A 127, 14	7) un Hydric Soil	less disturbe Present?	ed or problema	
Strippec Restrictive Type: Depth (in Remarks:	l Matrix (S6) Layer (if observed) ches): o Soil Man Unit	: Data ava	Red Parent I	Material (F	21) (MLF	2A 127, 14	7) un Hydric Soil	less disturbe Present?	ed or problema	
Stripped Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	2A 127, 14	7) un Hydric Soil	less disturbe	ed or problema	
Stripped Restrictive Type: Depth (in Remarks: No	l Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F Pa	21) (MLF	<u>2A 127, 14</u>	7) un Hydric Soil	less disturbe	Yes 🔽	No
Strippec Restrictive Type: Depth (in Remarks: N	l Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	2A 127, 14	7) un	Present?	Yes 🔽	
Strippec Restrictive Type: Depth (in Remarks: N	l Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	(MLF	<u>2A 127, 14</u>	7) un	Present?	Yes	No
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	<u>24 127, 14</u>	7) un	Present?	Yes Ves	No
Strippec Restrictive Type: Depth (ind Remarks: N	l Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	<u>8 127, 14</u>	7) un	Present?	Yes 📝	No
Strippec Restrictive Type: Depth (ind Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F ⊋a	21) (MLF	A 127, 14	7) un	Present?	Yes 📝	No
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLR	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLF	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLR	A 127, 14	7) un	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Ared Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Ared Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Red Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	No
Strippec Restrictive Type: Depth (in Remarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Ared Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 🔽	
Stripped Striptive Type: Depth (in Stemarks: N	I Matrix (S6) Layer (if observed) ches): o Soil Map Unit	: Data ava	Ared Parent I	Material (F	21) (MLR	A 127, 14	7) un Hydric Soil	Present?	Yes 🔽	No

US Army Corps of Engineers

Project/Site: EMDF NT9-D	City/County: Roane	Sampling Date: 6/4/18
Applicant/Owner: EMDF	Stat	e: TN Sampling Point:
Investigator(s): Jamie Herold	Section, Township, Range:	
Landform (hillslope, terrace, etc.): Terrace	Local relief (concave, convex, none): le	evel/concave Slope (%):
Subregion (LRR or MLRA): Lat:35°57"	20.44"N Long: 84°18'1	5.77"W Datum:
Soil Map Unit Name:	N	IWI 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 signific	antly disturbed? Are "Normal Circu	mstances" present? Yes 🖌 No 📃
Are Vegetation Soil, or Hydrology natura	ly problematic? (If needed, explain	any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map show	ving sampling point locations, t	ransects, important features, etc.
Hydrophytic Vegetation Present? Yes 🖌 No	Is the Sampled Area	
Hydric Soil Present? Yes ✓ No	within a Wetland?	Yes 🔽 No 🛄
Wetland Hydrology Present? Yes 🗸 No		
Remarks:		
0.20 acre wetland located approximately 35 feet so	uth of NT9-B.	
The wetland begins along the southernmost portion	of NT9 before the tributary emptie	es into Bear Creek. The wetland
then curves to follow the riparian zone of Bear Cree	K	
HYDROLOGY		
Wetland Hydrology Indicators:	Seco	ndary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that a		Surface Soil Cracks (B6)
Surface Water (A1)	atic Plants (B14)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	Sulfide Odor (C1)	Drainage Patterns (B10)
Saturation (A3)	Rhizospheres on Living Roots (C3)	Aoss Trim Lines (B16)
Water Marks (B1)	of Reduced Iron (C4)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	on Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)
Drift Deposits (B3)	Surface (C7)	Saturation Visible on Aerial Imagery (C9)
Algai Mai or Crusi (B4)		Sumership Desition (D2)
Inundation Visible on Aerial Imagery (B7)		Shallow Aquitard (D3)
Water-Stained Leaves (B9)		Aicrotopographic Relief (D4)
Aguatic Fauna (B13)		AC-Neutral Test (D5)
Field Observations:	·	
Surface Water Present? Yes No 🗸 Depth (ir	ches):	
Water Table Present? Yes V No Depth (in	ches): 4	
Saturation Present? Yes V No Depth (in	ches): 0 Wetland Hydrol	ogy Present? Yes 🗸 No
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial	photos, previous inspections), if available:	
Remarks:		
close proximately to Bear Creek and a major tributa	ry	
multiple wet weather conveyances		
wettest in drainages		
concave surfaces with sparse vegetation (10ft or m	ore diameter)	

US Army Corps of Engineers

	Absolute	Dominant	Indicator	Dominance Test worksheet
Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species
1. Sweetgum (Liquidambar styraciflua)	25	D	FAC	That Are OBL, FACW, or FAC: 6 (A)
Red Maple (Acer rubrum)	25	D	FAC	
Sycamore (Platanus occidentalis)	10		FACW	I lotal Number of Dominant Species Across All Strata: 6 (B)
Redbud (Cercis canadensis)	5		FACU	
				Percent of Dominant Species
	5			That Are OBL, FACW, or FAC: 100 (A/I
J	65		· *	Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: 32.5	20% of	total cover:	13	OBI species x1 =
Sapling Stratum (Plot size:)				EACW species x2 -
1				EAC species x3 -
2				
3				FACU species X 4 =
4.				UPL species X 5 =
5				Column Totals: (A) (B
5 5				Prevalence Index – B/A –
	-	- Total Cov		Hydrophytic Vegetation Indicators
	-		-1	
50% of total cover:	20% of	total cover:		
Shrub Stratum (Plot size:)	540			2 - Dominance Test is >50%
1	40	<u>D</u>	FAC	3 - Prevalence Index is ≤3.0
2. Spicebush (Lindera benzoin)	20		FAC	4 - Morphological Adaptations' (Provide supportin
3. Green Ash (Fraxinus pennsylvanica)	5		FACW	
4. Ironwood (Carpinus caoliniana)	5		FAC	Problemauc Hydrophyuc Vegetauon' (Explain)
5. Red Maple (Acer rubrum)	5		FAC	
6. Flowering Dogwood (Cornus florida)	2		FACU	Indicators of hydric soil and wetland hydrology must
	77	- Total Cov	or	De present, uniess disturbed of problematic.
500/ 51.1 38.5			15 /	Definitions of Five vegetation Strata:
50% of total cover: <u>50.5</u>	20% of	total cover:	13.4	Tree – Woody plants, excluding woody vines,
Herb Stratum (Plot size:)	05	-		approximately 20 ft (6 m) or more in height and 3 in.
1. Prairie Wedgescale (Sphenopholis oblusata)	20	<u> </u>	FAC	(7.6 cm) of larger in diameter at breast height (DBH).
2. Stilt Grass (Microstegium vimineum)	20	<u> </u>	FAC	Sapling – Woody plants, excluding woody vines,
3. Jewelweed (Impatiens capensis)	15	<u> </u>	FACW	approximately 20 ft (6 m) or more in height and less
4. Cherokee Sedge (Carex cherokeensis)	10		FACW	
5. Poison Ivy (Toxicodendron radicans)	10		FAC	Shrub – Woody plants, excluding woody vines,
6. Water Hemlock (Ciculata maculata)	5		OBL	approximately 3 to 20 ft (1 to 6 m) in height.
7. Virginia creeper (Parthenocissus quinquefolia	5		FACU	Herb – All herbaceous (non-woody) plants, including
R Sensitive Fern (Onoclea sensibilis)	3		FACW	herbaceous vines, regardless of size, and woody
Spotted ioe-pve weed (Eutrochium maculatu	3		FACW	plants, except woody vines, less than approximately
10 Hog peanut (Amphicarpaea bracteata)	3		FAC	i (i m) in height.
10. Christmas Fern (Polystichum acrostichoides	1		FACIL	Woody vine - All woody vines, regardless of height.
	100		17100	Apple per og topp top
	100	= Total Cov	er	
50% of total cover: 50	20% of	total cover:	20	
Noody Vine Stratum (Plot size:)				
1				
2				
3.				
4				
5			. <u> </u>	
<u></u>		- Total Carr		Hydrophytic
	-		-1	Present? Yes No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate s	heet.)			L

Sampling Point: <u>NT9-D</u>

(inches)	Matrix		Red	ox Feature	es			
0.4	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-4	10YR 4/1	100	<u>.</u>				SiL	
4-10	10YR 5/2	50	10YR 5/3	48			SiC	
	- C -		10YR 5/6	2	C	M	SiC	
10-13	10YR 5/2	100						
10 10	1011(0/2					· •		
					- 10			
			·					
	e <u>e</u>						<u> </u>	
	31 e				a. 16	2		
vpe: C=0	Concentration. D=De	pletion, RM	A=Reduced Matrix, N	- AS=Maske	d Sand Gr	ains	² Location: PL=Po	ore Lining, M=Matrix
dric Soi	I Indicators:						Indicators	for Problematic Hydric Soils
Histoso	ol (A1)		Dark Surfac	ce (S7)			🔲 2 cm N	Muck (A10) (MLRA 147)
Histic E	Epipedon (A2)		D Polyvalue E	Below Surfa	ace (S8) (N	ILRA 147,	148) 🔲 Coast	Prairie Redox (A16)
Black I	Histic (A3)		Thin Dark S	Surface (SS)) (MLRA 1	47, 148)	(ML	.RA 147, 148)
Hydrog	en Sulfide (A4)		Loamy Gley	ed Matrix	(F2)		L Piedm	iont Floodplain Soils (F19)
Stratifie	ed Layers (A5)		Depleted M	atrix (F3)	E6)			RA 136, 147)
Denlet	ed Below Dark Surfa	ce (A11)		ark Surface (e (F7)		Conther	(Explain in Remarks)
Thick [Dark Surface (A12)	()	Redox Dep	ressions (F	- (, , ,			(
Sandy	Mucky Mineral (S1)	(LRR N,	Iron-Manga	nese Mass	ses (F12) (LRR N,		
MLF	A 147, 148)		MLRA 1	36)			2	
Sandy	Gleyed Matrix (S4)		Umbric Sur	face (F13)	(MLRA 13	6, 122)	³ Indicato	rs of hydrophytic vegetation an
Sandy	Redox (S5)		Piedmont F	loodplain :	Soils (F19)	(MLRA 14	(8) wetland	I hydrology must be present,
strictive	Laver (if observed)	·		waterial (A 127, 14	n uniess	
Type	Euger (in observed)							
Depth (i	nches):						Hydric Soil Pres	sent? Yes 🗸 No 🖵
omorke	5 V		1000 ga av av av					
indiks.	la Cail Mara Lluit	Data au	ailalala fashlaia as	ea				
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Project/Site: EMDF UT-A	City/County: Roa	ne	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/conc	ave Slope (%):
Subregion (LRR or MLRA): Lat: 35°5	7'28.57''N	Long: 84°18'24.22''W	Datum:
Soil Map Unit Name:		NWI classifi	cation:
Are climatic / hydrologic conditions on the site typical for this tir	ne of year? Yes 🗹 N	lo 🔲 (If no, explain in F	Remarks.)
Are Vegetation Soil, or Hydrology sign	ificantly disturbed?	Are "Normal Circumstances"	present? Yes 🖌 No
Are Vegetation Soil , or Hydrology natu	rally problematic? (If needed, explain any answe	ers in Remarks.)
SUMMARY OF FINDINGS – Attach site map sh	owing sampling poi	nt locations, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes V		THE ALLOWER	<u>6</u>
Hydric Soil Present? Yes V No	Is the Sam	atland? Yes	
Wetland Hydrology Present? Yes V			
Remarks:	-		
0.66 acre wetland located north of the Haul Road	between NT9 and NT	10	
aul a a caracteria an actuationerae ba independent carte servicierangementeria			
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required: check all that	annluù	Surface Soil	Cracks (B6)
Surface Mater (A1)	uppry		related Conceve Surface (B8)
✓ High Water Table (A2) ☐ High Water Table (A2)	en Sulfide Odor (C1)	Drainage Pa	atterns (B10)
Saturation (A3)	d Rhizospheres on Livina I	Roots (C3) Moss Trim L	ines (B16)
Water Marks (B1)	ce of Reduced Iron (C4)	Dry-Season	Water Table (C2)
Sediment Deposits (B2)	Iron Reduction in Tilled So	ils (C6) 📝 Crayfish Bu	rrows (C8)
Drift Deposits (B3)	uck Surface (C7)	Saturation V	/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Explain in Remarks)	✓ Stunted or S	Stressed Plants (D1)
Iron Deposits (B5)		🗹 Geomorphic	Position (D2)
Inundation Visible on Aerial Imagery (B7)		🔲 Shallow Aqu	uitard (D3)
Water-Stained Leaves (B9)		Microtopogr	aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	I Test (D5)
Field Observations:	2		
Surface Water Present? Yes Yes No Depth	(inches): 2		
Water Table Present? Yes ✓ No Depth	(inches): 0		
Saturation Present? Yes ✓ No Depth	(inches): U	Wetland Hydrology Prese	nt? Yes 🔽 No 🔄
Describe Recorded Data (stream gauge, monitoring well, aeri	al photos, previous inspect	ions), if available:	
a 17502 UK 18 🔿 13			
Remarks:			
seasonally high groundwater table as well as drai	nage from the Haul R	oad and the surroundir	ig forest
portions of the wetland that are saturated or inunc	lated are sparsely veg	getated	
no clear drainage or tributary channel within the w	vetland		

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VEGETATION (Five Strata) – Use scientific na	ames of	plants.		Sampling Point: UT-A
	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	<u>% Cover</u>	Species?	Status	Number of Dominant Species
1. Red Maple (Acer rubrum)	20	<u> </u>	FAC	That Are OBL, FACW, or FAC: / (A)
2. Sweetgum (Liquidambar styraciflua)	10	<u>D</u>	FAC	Total Number of Dominant
3. Ironwood (Carpinus caroliniana)	10	<u>D</u>	FAC	Species Across All Strata: 7(B)
4. Green Ash (Fraxinus pennsylvanica)	10	D	FACW	
5.				That Are OBL EACW or EAC: 100 (A/P)
6	5- 		10 ⁰ 10	
	50	- Total Cov	or	Prevalence Index worksheet:
25	(<u></u>)	- 10001000	10	Total % Cover of: Multiply by:
50% of total cover: 23	20% of	total cover:	10	OBL species x 1 =
Sapling Stratum (Plot size:)				FACW species x2 =
1				FAC species x 3 =
2				FACII species x4 -
3				
4				Column Totalo. (A) (D)
5.				
6				Prevalence Index = B/A =
	2	= Total Cov	er	Hydrophytic Vegetation Indicators
				1 - Rapid Test for Hydrophytic Vocatation
50% of total cover:	20% of	total cover:		
Shrub Stratum (Plot size:)				2 - Dominance Test is >50%
1. Spicebush (Lindera benzoin)		<u> </u>	FAC	3 - Prevalence Index is ≤3.0"
2. Alder (Alnus serrulata)	5	·	OBL	4 - Morphological Adaptations' (Provide supporting
3				Drablematic Hydrophytic Vegetation ¹ (Evaluation
4	<u></u>			
5				
6.				Indicators of hydric soil and wetland hydrology must
	25	= Total Cov	er	Definitions of Five Vegetation Strate:
5000 to 1 12 5			5	Definitions of Five vegetation Strata:
50% of total cover: 12.3	20% of	total cover:	<u> </u>	Tree – Woody plants, excluding woody vines,
Herb Stratum (Plot size:)	00			approximately 20 ft (6 m) or more in height and 3 in.
1. Rice Cut Grass (Leersia oryzoides)	20	<u> </u>	OBL	(7.6 cm) or larger in diameter at breast height (DBH).
2. Trumpet-Creeper (Campsis radicans)	-10		FAC	Sapling – Woody plants, excluding woody vines,
3. False Nettle (Boehmeria cylindrica)	5		FACW	approximately 20 ft (6 m) or more in height and less
4. Jewelweed (Impatiens capensis)	5		FACW	than 3 ln. (7.6 cm) DBH.
5. Sensitive Fern (Onoclea sensibilis)	2		FACW	Shrub – Woody plants, excluding woody vines,
6. Poison Ivy (Toxicodendron radicans)	20	D	FAC	approximately 3 to 20 ft (1 to 6 m) in height.
7. Virginia-Creeper (Parthenocissus quinquefoli	5		FACU	Herb – All herbaceous (non-woody) plants, including
8.	12			herbaceous vines, regardless of size, and woody
9				plants, except woody vines, less than approximately 3
10	17	3 .	50 8 68	it (i m) in neight.
11	·			Woody vine – All woody vines, regardless of height.
- 11. <u></u>	67			AND 27 VL VIII VVD
		= Total Cov	er	
50% of total cover: 33.5	20% of	total cover:	13.4	
Woody Vine Stratum (Plot size:)				
1				
2				
3.				
4.				
5				
	-	- Total Cov	or	Hydrophytic
		- 10001000		Present? Yes V No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate s	heet.)			
Tubercled Rein Orchid (Platanthera flava var. h	erbiola) r	nainly in s	shrubby a	area at south end
LIS Army Corps of Engineers				Eastern Mountains and Diadment - Marriss 2.0
US Army Corps of Engineers				Eastern wountains and Pleamont – version 2.0

Dente	cription: (Describe	to the de	pth needed to docur	nent the	indicator	or confirm	n the absence	of indicato	ors.)	
(inchos)	Matrix	0/	Redo	x Feature	Type1	Loc ²	Toxture		Domorko	
$\frac{(\text{inches})}{0.2}$		%	Color (moist)	70	Type	LOC	Texture	<u></u>	Remarks	
2 10	10VP 5/2	00	10VP 5/6	10	<u> </u>		SiC	÷		
2-10		- 90			<u> </u>	- 1VI	- 310			
	-C		·	· · · · ·	< 0 <u></u>	~ <u> </u>				
	8 8	-0				10		-		
	48 c									
	10 m									
		- <u>-</u>			< 0 	· · · · · · · · · · · · · · · · · · ·		÷		
	31 m				n 18					
	Concentration D-Der	lation PA		S-Masko	d Sand Cr	aine	² Location: D		na M-Matrix	
Hydric Soi	Indicators:	JIEUOII, IXI	n=reduced Matrix, Mi	3-IVIdSKC	u Sanu Gr	ants.	Indica	ators for Pr	oblematic Hy	dric Soils
📕 Histoso	ol (A1)		Dark Surface	e (S7)			 2	cm Muck (/	A10) (MLRA 1	47)
Histic E	Epipedon (A2)		🔲 Polyvalue Be	elow Surfa	ace (S8) (1	MLRA 147	. 148) 🔲 C	oast Prairie	Redox (A16)	
Black H	listic (A3)		Thin Dark Su	Irface (SS) (MLRA	147, 148)		(MLRA 14	7, 148)	
Hydrog	en Sulfide (A4)		Loamy Gleye	ed Matrix	(F2)		ЦP	MIDA 12	odplain Soils	(E19)
2 cm N	luck (A10) (LRR N)		Redox Dark	Surface (F6)			ery Shallow	/ Dark Surface	(TF12)
Deplete	ed Below Dark Surfac	ce (A11)	🔲 Depleted Da	rk Surface	e (F7)		Ē	ther (Explai	in in Remarks)	
Thick E	Dark Surface (A12)		Redox Depre	essions (F	8)					
Sandy	Mucky Mineral (S1) (LRR N,	Iron-Mangan	ese Mass	ses (F12) ((LRR N,				
Sandy	Gleved Matrix (S4)		Umbric Surfa	oj ace (F13)	(MLRA 13	36, 122)	³ Ind	icators of hy	vdrophytic vea	etation and
Sandy	Redox (S5)		Piedmont Flo	podplain S	Soils (F19)	(MLRA 1	18) we	tland hydro	logy must be p	present,
									10 (147)(s)	24
Strippe	d Matrix (S6)		🔲 Red Parent I	Material (F	-21) (MLF	RA 127, 14	7) un	less disturb	ed or problema	atic.
Strippe Restrictive	d Matrix (S6) Layer (if observed)	:	Red Parent N	Vaterial (F	-21) (MLH	A 127, 14	7) un	less disturb	ed or problema	atic.
Strippe Restrictive	d Matrix (S6) Layer (if observed)	:	Red Parent M	Material (I	-21) (MLF	RA 127, 14	7) un	less disturb	ed or problema	atic.
Strippe Restrictive Type: Depth (ii	d Matrix (S6) • Layer (if observed) nches):	:	Red Parent M	Vaterial (f	-21) (MLF	2A 127, 14	7) un Hydric Soil	less disturb Present?	ed or problema Yes	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) • Layer (if observed) nches): No Soil Map Unit	: Data av	Red Parent M	Vaterial (f	-21) (MLF	2A 127, 14	7) un Hydric Soil	less disturb	ed or problema	No
Strippe Restrictive Type: Depth (in Remarks:	d Matrix (S6) Layer (if observed) nches): No Soil Map Unit	: Data av	Red Parent N	Material (f ea	-21) (MLF	<u>A 127, 14</u>	7) un Hydric Soil	less disturb	Yes <u>Yes</u>	
Strippe Restrictive Type: Depth (ii Remarks: N	d Matrix (S6) Layer (if observed) nches): No Soil Map Unit	: Data av	Red Parent N	Material (f	-21) (MLF	<u>24 127, 14</u>	7) un	Present?	Yes Ves	
Strippe Restrictive Type: Depth (ii Remarks: N	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data avi	Red Parent N	Material (f	-21) (MLF	<u>24 127, 14</u>	7) un Hydric Soil	Present?	Yes	
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data avi	Red Parent N	Material (f	-21) (MLF	<u>A 127, 14</u>	7) un	Present?	Yes	
Strippe Restrictive Type: Depth (ii Remarks: N	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data avi	Red Parent N	Material (f	-21) (MLH	<u>A 127, 14</u>	7) un	Present?	Yes 📝	
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent N	Material (f	21) (MLK	A 127, 14	7) un	Present?	Yes 📝	
Strippe Restrictive Type: Depth (i Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent N	√aterial (f	-21) (MLK	A 127, 14	7) un	Present?	Yes 📝	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent N	Material (f	-21) (MLK	A 127, 14	7) un	Present?	Yes 📝	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent N	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 📝	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent Median Parent Me	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent Median Parent Me	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 📝	No
Strippe Restrictive Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 🔽	No
Stripper Type: Depth (in Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 📝	No
Stripper Type: Depth (ii Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un Hydric Soil	Present?	Yes 🔽	No
Strippe Restrictive Type: Depth (in Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un Hydric Soil	Present?	Yes 📝	No
Strippe Restrictive Type: Depth (in Remarks:	d Matrix (S6)	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 🔽	No
Stripper Type: Depth (in Remarks:	d Matrix (S6) Layer (if observed) Inches): No Soil Map Unit	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un	Present?	Yes 🔽	No <u></u>
Strippe Restrictive Type: Depth (in Remarks:	d Matrix (S6)	: Data av	Red Parent M	Material (f	-21) (MLk	A 127, 14	7) un Hydric Soil	Present?	Yes 🔽	No <u></u>

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/concabe Slope (%):
Subregion (LRR or MLRA): Lat: 35°57'25	5.93''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	f year? Yes 🔽 No 🛄 (If no, explain in Remarks.)
Are Vegetation Soil , or Hydrology significar	ntly 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 showi	ng sampling point locations, transects, important features, etc.
Hudrophytic Vegetetien Drecent?	
Hydrophylic Vegetation Present?	Is the Sampled Area within a Wetland? Ves ✓ No
Wetland Hydrology Present?	
Remarks:	
0.10 acre wetland located just south of the Haul Roac	1
Wetland Undralagy Indiastory	Secondary Indicators (minimum of two required)
Deine my ladie stere (minimum of ano is remained, she she all thet and	
Surface Water (A1)	C Plants (B14) Sparsely Vegetated Concave Surface (B8)
I High Water Table (A2) Hydrogen Si	unide Odor (CT) Drainage Patients (BT0)
Water Marks (B1)	Reduced Iron (C4)
Sediment Deposits (B2)	Reduction in Tilled Soils (C6) \Box Cravitsh Burrows (C8)
Drift Deposits (B3)	Surface (C7)
Algal Mat or Crust (B4)	ain in Remarks)
Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No 🗹 Depth (inch	nes):
Water Table Present? Yes 🗹 No 💭 Depth (inch	nes): <u>6</u>
Saturation Present? Yes 🗹 No 💭 Depth (inch	nes): 2 Wetland Hydrology Present? Yes 🖌 No 🦲
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial ph	notos, previous inspections), if available:
besites recorded bate (or early gadge, monitoring well, dend pr	
Remarks:	
a seasonally high groundwater table along with draina	age from the Haul Road and the surrounding forest
wetland forms along a defined drainage channel	ure en underennen e seren e renderstation mense zastredensederstander

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0.00	Abada	Dani	In all a 1	Deminence Testuralech
Free Stratum (Plot size:	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
Red Maple (Acer rubrum)	50	D	FAC	Number of Dominant Species
Tuliptree (Liriodendron tulipifera)	20		FACU	That Are OBL, FACW, OFFAC.
Sweetoum (Liquidambar styraciflua)	10		FAC	Total Number of Dominant
				Species Across All Strata: <u>o</u> (B)
v		3	0	Percent of Dominant Species
	- /	100	in the	That Are OBL, FACW, or FAC: 100 (A/E
L	-			Barriel and a state of the stat
	80	= Total Cov	er	Prevalence Index worksheet:
50% of total cover: 40	20% of	total cover	16	<u>Total % Cover of:</u> <u>Multiply by:</u>
Capling Stratum (Diot size:				OBL species x 1 =
japinių su atamį (Fiot size)				FACW species x 2 =
				FAC species x 3 =
			0 0	FACU species x 4 =
				UPL species x 5 =
		-	··	Column Totals: (A) (B
		2		Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
500/ fr + 1				1 - Rapid Test for Hydronbytic Veretation
50% of total cover:	20% of	total cover:		2 Dominance Testic > E0%
Shrub Stratum (Plot size:)	25	5	FAC	\square 2 - Dominance results >50%
Spicebush (Lindera benzoin)		<u> </u>	FAC	3 - Prevalence Index is ≤3.0
2. Green Ash (Fraxinus pennsylvanica)	10	s	FACW	4 - Morphological Adaptations' (Provide supportin
ί. <u>.</u>				
				Problematic Hydrophytic Vegetation' (Explain)
	2			2
	<u> </u>		0. <u> </u>	¹ Indicators of hydric soil and wetland hydrology must
		Tatal Car	0. 2	be present, unless disturbed or problematic.
17.5	· · · · · · · · · · · · ·		ei →	Definitions of Five Vegetation Strata:
50% of total cover: 17.5) 20% of	total cover:	<u> </u>	Tree – Woody plants, excluding woody vines.
lerb Stratum (Plot size:)				approximately 20 ft (6 m) or more in height and 3 in.
Stilt Grass (Microstegium vimineum)	30	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH).
Jewelweed (Impatiens capensis)	10	D	FAWM	Sanling Moody plants, excluding woody vines
Leathery Rush (Juncus coriaceus)	10	D	FACW	approximately 20 ft (6 m) or more in height and less
Hog peanut (Amphicarpaea bracteata)	10	D	FAC	than 3 in. (7.6 cm) DBH.
Groundput (Anios americana)	10		FACIN	
Trumpet Crooper (Campeis radicane)	10	<u> </u>	EAC	approximately 3 to 20 ft (1 to 6 m) in height
Charakaa Sadaa (Carrysharakaans)		<u> </u>	FAC	
Unerokee Sedge (Carex cherokeensis)	<u> </u>		FACW	Herb – All herbaceous (non-woody) plants, including
	-		00:	(
Water Hemlock (Ciculata maculata)	5	3 <u>4</u>	OBL	herbaceous vines, regardless of size, and woody
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica)	5 5		OBL FACW	herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 It (1 m) in height.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita)	5 5 5		OBL FACW OBL	herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately (It (1 m) in height.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) <u>p</u> Fringed Sedge (Carex crinita)	5 5 5		OBL FACW OBL	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) _{0.} Fringed Sedge (Carex crinita) 1.	5 5 5 100		OBL FACW OBL	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0 Fringed Sedge (Carex crinita)	5 5 5 100	= Total Cov	OBL FACW OBL er	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) o Fringed Sedge (Carex crinita) 150% of total cover: 50	5 5 5 100 20% of	= Total Cov	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) o Fringed Sedge (Carex crinita) 1	5 5 100 20% of	Total Cov	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cov	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cov	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cov	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cov total cover:	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cov total cover:	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) o, Fringed Sedge (Carex crinita) 1	5 5 100 20% of	Total Cover:	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0 Fringed Sedge (Carex crinita) 1	5 5 100 20% of	= Total Cover:	OBL FACW OBL er 20	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.
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita) 1	5 5 20% of 20% of 20% of	= Total Cover: total cover: = Total Cov total cover:	OBL FACW OBL er 20 er er er er er er	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
Water Hemlock (Ciculata maculata) False Nettle (Boehmeria cylindrica) 0, Fringed Sedge (Carex crinita) 1	5 5 20% of 20% of 20% of 20% of 20% of 3theet.)	= Total Cover: total cover: = Total Cover: = Total Cover:	OBL FACW OBL er 20 er er er er	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

SOIL								Sampling Point: 01-B
Profile Des	cription: (Describe	to the dept	th needed to docur	nent the i	ndicator	or confirn	n the absence of	of indicators.)
Depth	Matrix		Redo	x Features	5		And Statements	
(inches)	Color (moist)	%	Color (moist)	%	Type'	Loc ²	Texture	Remarks
0-2	10YR 5/3		10)/D 5/0				SIL	2 7
2-6	10YR 5/2	- 98	10YR 5/6	2			SIL	
6-12	10YR 5/2	95	10YR 5/6	5	C	. <u>IVI</u>	SIL	<u>.</u>
	·	<u> </u>						÷
						150		
					13			
	20 12				6			
	əl #				2			
¹ Type: C=C	Concentration, D=Dep	letion, RM=	Reduced Matrix, MS	S=Masked	Sand Gr	ains.	² Location: PL	=Pore Lining, M=Matrix.
Hydric Soil	Indicators:						Indica	tors for Problematic Hydric Soils ³ :
Histoso	l (A1)		Dark Surface	(S7)			2	cm Muck (A10) (MLRA 147)
Histic E	pipedon (A2)		Polyvalue Be	low Surfa	ce (S8) (M	ALRA 147,	148) 📙 Co	oast Prairie Redox (A16)
	en Sulfide (A4)			ed Matrix (F2)	147, 148)	D Pi	edmont Floodplain Soils (F19)
Stratifie	d Layers (A5)		Depleted Ma	trix (F3)	-/			(MLRA 136, 147)
2 cm M	uck (A10) (LRR N)	(4.4.4.)	Redox Dark	Surface (F	6)			ry Shallow Dark Surface (TF12)
	ed Below Dark Surfac Dark Surface (A12)	e (ATT)		K Surface	(F7) 3)			ner (Explain in Remarks)
Sandy I	Mucky Mineral (S1) (LRR N,	Iron-Mangan	ese Mass	es (F12) (LRR N,		
MLR	A 147, 148)		MLRA 13	6)			3	
Sandy C	Gleyed Matrix (S4) Redox (S5)		Dedmont Elc	ce (F13) (odplain S	MLRA 13 oils (E19)	6,122) (MIRA 14	Indu (18) wet	cators of hydrophytic vegetation and land hydrology must be present
Stripper	d Matrix (S6)		Red Parent N	Aaterial (F	21) (MLR	A 127, 14	7) unle	ess disturbed or problematic.
Restrictive	Layer (if observed)	:			NO 2003	-		
Туре:	50 W						2011 12012 15 15140	
Depth (ir	nches):						Hydric Soil	Present? Yes 🔽 No 🗔
Remarks:	lo Soil Map Unit I	Data avai	lable for this are	a				

US Army Corps of Engineers

Project/Site EMDF UT-C City/County: R	oane Sampling Date: 5/9/18
Applicant/Owner: EMDF	State: TN Sampling Point: 1
Investigator(s) Jamie Herold Section Towns	hin Range
Landform (hillslope, terrace, etc.) Terrace	ve. convex. none). level/concave Slope (%):
Subregion (LRR or MLRA): Lat: 35°57'20.59''N	Long: 84°18'21.18'W Datum:
Soll Map Unit Name:	Eorig Batam
Are climatic / hydrologic conditions on the site typical for this time of year? Yes	No (If no, explain in Remarks.)
Are Vigratation Sciller or Hydrology Conditions on the site typical of this time of year? Tes	Are "Normal Circumstances" procept? Voc V
Are Vegetation Soli, or Hydrology significantly distributed?	Are Normal Circumstances present? Tes
Are vegetation, or hydrologynaturally problematic?	(in needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling p	oint locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes Volume No	ampled Area
Hydric Soil Present? Yes V No within a	Wetland? Yes V No
Wetland Hydrology Present? Yes Ves No	
Remarks:	
0.10 acre wetland near mammal plot 14. South of Bear Creek Rd alc	ona trib
HADBOI OCA	
	Secondary Indicators (minimum of two required)
Drimony Indicators (minimum of one is required, shock all that apply)	
	Sparsely vegetated Concave Surface (B8)
High Water Lable (A2) Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Visiter Marka (P1)	Ig Roots (C3) I Woss Tim Lines (B16)
Water Marks (B1) Presence of Reduced from (C4)	Crite (CC)
	Solis (C6) Craylish Burrows (C8)
	Saturation Visible on Aerial Imagery (C9)
	Stunted or Stressed Plants (DT)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
water-Stained Leaves (B9)	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No Depth (inches):	
Water Table Present? Yes 🗹 No 🛄 Depth (inches): 🗌	
Saturation Present? Yes ✓ No Depth (inches):	Wetland Hydrology Present? Yes Ves No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous insp	ections), if available:
Remarks:	
The wetland begins along the snarsely vegetated channel before so	reading out to include low laying areas dominated by
herbaceous vegetation	cading out to include low laying areas dominated by

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VEGETATION (Five Strata) – Use scientific na	ames of p	plants.		Sampling Point: <u>UT-C</u>
	Absolute	Dominant	Indicator	Dominance Test worksheet:
<u>1.</u> American Elm (Ulmus Americana)	<u>% Cover</u> 20	D	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2				Total Number of Dominant
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: <u>100</u> (A/B)
~	20	= Total Cov	er	Prevalence Index worksheet:
50% of total cover: <u>10</u>	20% of	total cover:	4	OBL species x1 =
Sapling Stratum (Plot size:) 1.				FACW species x 2 =
2				FAC species x 3 =
3				FACU species X 4 =
4				Column Totals: (A) (B)
5 6				Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
Shrub Stratum (Plot size:)				2 - Dominance Test is >50%
1. Spicebush (Lindera benzoin)	2		FAC	3 - Prevalence Index is $\leq 3.0^{1}$
2				data in Remarks or on a separate sheet)
4				Problematic Hydrophytic Vegetation ¹ (Explain)
5				¹ Indicators of hydric soil and wotland hydrology must
6				be present, unless disturbed or problematic.
	<u> </u>	= Total Cov	er	Definitions of Five Vegetation Strata:
50% of total cover:	20% of	total cover:		Tree – Woody plants, excluding woody vines,
1 Poison Ivy (Toxicodendron radicans)	30	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH).
2 Stilt Grass (Microstegium vimineum)	30	D	FAC	Senling - Weedy plents, evoluting weedy vines
3. Frank's Sedge (Carex frankii)	10		OBL	approximately 20 ft (6 m) or more in height and less
4. Jewelweed (Impatiens capensis)	10		FACW	than 3 in. (7.6 cm) DBH.
5. Jack-in-the-Pulpit (Arisaema triphyllum)	2	· <u> </u>	FACW	Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
7				Herb – All herbaceous (non-woody) plants, including
8				herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3
9				ft (1 m) in height.
10				Woody vine – All woody vines, regardless of height.
	83	= Total Cov	er	
50% of total cover: 41.5	20% of	total cover:	16.6	
Woody Vine Stratum (Plot size:)				
1				
3				
4				
5	-			Hydrophytic
		= Total Cov	er	Vegetation Present? Yes No
50% of total cover:	20% of	total cover:		
most woody vegetation outside of wetland	neet.j			

Sampling	Point	UT-C

Profile Description: (Description: (Descript	SOIL								Sa	ampling Pol	nt: 01-0
Depth (methes) Matrix Centors(1) Solution Toture Remarks 0-10 10YR 5/2 95 00tf most) 55 C M SiLo	Profile Des	cription: (Describe	to the dept	h needed to docu	ment the ind	icator	or confirm	the absence	of indicator	s.)	
Citch (most) % Type ¹ Loc ² Totage Remarks C10 10YR 5/2 95 10YR 5/6 5 C M SiLo Image: State of the st	Depth	Matrix		Redo	ox Features						
C-10 10YR 5/2 95 10YR 5/6 5 C M SiLo Image: Concentration Doppletion, EM-Reduced Matrix, MS-Masked Sand Crains. Image: Concentration, Doppletion, EM-Reduced Matrix, MS-Masked Sand Crains. Image: Type: Concentration, Doppletion, EM-Reduced Matrix, MS-Masked Sand Crains. Image: Concentration, Doppletion, EM-Reduced Matrix, MS-Masked Sand Crains. Image: Concentration, Doppletion, EM-Reduced Matrix, MS-Masked Sand Crains. Image: Histic Epipedon (I/2) Dark Surface (S3) Dark Surface (S3) Image: Concentration, Cr2 Image: Histic Epipedon (I/2) Dark Surface (F2) Depipedon Bark Surface (F1) Image: Concentration Reduced Matrix, Cr2 Image: Concentration, Cr2 Image: Concentration (S4) Depipedon Bark Surface (F1) Image: Concentration, Cr2 Image: Concentration, Cr2 Image: Concentration, Cr2 Image: Concentration (S4) Depipedon Cr2 Depipedon Cr2 Image: Concentration, Cr2 Image: Concentration, Cr2 Image: Concentration (S4) Depipedon Cr2 Depipedon Cr2 Image: Concentratice Cr2 Image	(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture		Remarks	
'Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Send Grains. 'Location: PL-Pere Lining, M-Matrix. 'Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Send Grains. 'Location: PL-Pere Lining, M-Matrix. 'Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Send Grains. 'Location: PL-Pere Lining, M-Matrix. 'Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Send Grains. 'Location: PL-Pere Lining, M-Matrix. 'Histosof (A) Dark Surface (S) Indicators for Profilematic Hydric Solis? Straffiel Charks, Straffiel (A) Dark Surface (S) Indicators for Profilematic Hydric Solis? Depleted Bate Kinfiel (C) Depleted Bate Kinfiel (F) Red Kinfiele (F) Sendy Glevy Matrix (S) Depleted Bate Kinfiel (F) NuRA 147, 148) Sendy Glevy Matrix (S) Depleted Bate Kinfiel (F) 'Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Sendy Glevy Matrix (So) Defeted Bate Kinfiel (F) 'Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Sendy Glevy Matrix (So) Defeted Bate Kinfiel (F) 'Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Depleted Bate Kinfiel (F) Red Kinfiel (F) 'Indicators of hydrophytic vegetation and wetland hydrology m	0-10	10YR 5/2	95	10YR 5/6	5 (С (М	SiLo			
Type: C-Concentration, D-Depletion, RM-Peduced Matrix, MS-Masked Sand Grains. ** Location: PL-Pore Lining, M-Matrix. Type: C-Concentration, D-Depletion, RM-Peduced Matrix, MS-Masked Sand Grains. ** Location: PL-Pore Lining, M-Matrix. Type: C-Concentration, D-Depletion, RM-Peduced Matrix, MS-Masked Sand Grains. ** Location: PL-Pore Lining, M-Matrix. Histo: Epipodon (A2) Dark Surface (S3) PL-Pore Lining, M-Matrix. Histo: Epipodon (A2) Dark Surface (S3) PL-Pore Lining, M-Matrix. Histo: Epipodon (A2) Dorder Matrix (F2) PL-Pore Lining, M-Matrix. Stratified Layers (A3) Dorder Matrix (F2) PL-Pore Lining, M-Matrix. PL-Pore Lining, M-Matrix. Depleted Matrix (F3) Dorder Matrix (F2) Plotogon Strates (F12) Plotogon Strates (F12) Plotogon Strates (F12) Depleted Darkov Dark Surface (F3) Depleted Matrix (F3) Plotogon Strates (F12) P		0.5	-892		0 1 0 						
"Ingre: C-Concentration. D-Depletion. RM-Reduced Matrix, MS-Masked Sand Grains." * Location: PL-Pore Lining, M-Matrix. "Indicators is proportionation of the image of the im		8.8			0 				<u></u>		
Image: C_Concentration. D_Depletion. RM-Reduced Matrix, MS-Masked Sand Grans. *Location: PL=Pore Lining, M-Matrix. Image: C_Concentration. D_Depletion. RM-Reduced Matrix, MS-Masked Sand Grans. *Location: PL=Pore Lining, M-Matrix. Image: C_Concentration. D_Depletion. RM-Reduced Matrix, MS-Masked Sand Grans. *Location: PL=Pore Lining, M-Matrix. Image: C_Concentration. D_Depletion. RM-Reduced Matrix, MS-Masked Sand Grans. *Location: PL=Pore Lining, M-Matrix. Image: C_Concentration. D_Depletion. RM-Reduced Matrix, CS3 Depletion. RM-Reduced Matrix, CS3 Depletion. RM-Reduced Matrix, CS3 Image: C_Concentration. D_Depletion. RM-Reduced Matrix, CS3 Depletion. RM-Reduce (F6) Depletion. RM-Reduce (F6) Depleted Bdew Dark Surface (A11) Depletion. Rodix RC3 Depletion. RM-Reduce (F6) Depletion. Rodix RC3 Sandy Redox (S6) Depletion. Rodix RC3 Depletion. Rodix RC3 Plenoment Fioodplana Solis (F19) (MLRA 135, 122) Pindcators of hydrophytic vegetation and velicant hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Plenoment Fioodplana Solis (F19) (MLRA 127, 147) Plenoment Fioodplana Solis (F19) (MLRA 127, 147) Depting Matrix, (S6) Plenoment Fioodplana Solis (F19) (MLRA 136, 122) (MLRA 136, 123) Plenoment Fioodplana Solis (F19) (MLRA 136, 123) (MLRA 136, 124) Dipting Matrix, (S6) Plenoment Fioodplana Solis (F19)		e o		·							
"Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Crains. "tocation: PL-Pore Lining, M-Matrix. Histos (10) Dark Surface (57) Indicators to "Problematic Hydric Soils". Histos (10) Dark Surface (57) Indicators to "Problematic Hydric Soils". Histos (10) Dark Surface (57) Indicators to "Problematic Hydric Soils". Histos (10) Dark Surface (57) Indicators to "Problematic Hydric Soils". Histos (10, 10) Dark Surface (57) Indicators to "Problematic Hydric Soils". Stratief Layres (A5) Depleted Matrix (F2) MLRA 147, 189 Depleted Matrix (F3) Depleted Matrix (F3) MLRA 136, 112) Sandy Redw Dark Surface (11) Depleted Matrix (F3) Indicators of hydrophytic vegetation and wedard hydrology must be present, unless disturbed or problematic. Restrictive Layre (10) Dark Surface (12) MLRA 136, 112) Indicators of hydrophytic vegetation and wedard hydrology must be present, unless disturbed or problematic. Restrictive Layre (10) Depted Matrix (S4) Depted Matrix (S6) Present (12) (MLRA 127, 147) Sandy Redw (S5) Depted Matrix (S6) Present (12) (MLRA 126, 122, 147) Indicators of hydrophytic vegetation and wedard hydrology must be present, unless disturbed or problematic. Type: <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>											
''ppe: C=Concentration, D=Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. ''tocation: PL=Pore Lining, M=Matrix. ''pdfe Soil Indicators											
"Type: C-Concentration. D-Depletion. RM-Reduced Matrix. MS-Masked Sand Grains. *Location: PL-Pore Lining. M-Matrix. Indicators to Public Construction. Indicators to Public Construction. Indicators to Public Construction. Indicators to Public Construction. Instruction. Instruction. Instruction. Indicators to Public Construction. Indicators to Public Construction. Instruction. Instruction. Instruction. Instruction. Instruction. Instruction. Instruction. CAN Instruction. Instruction. <td>0</td> <td>3 .</td> <td></td> <td>d</td> <td>· · · · · · · · ·</td> <td></td> <td>88.</td> <td>s</td> <td></td> <td></td> <td></td>	0	3 .		d	· · · · · · · · ·		88 .	s			
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"Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. *Location: PL=Pore Lining, M=Matrix, md=Matrix, MS=Masked Sand Grains. "Hydric Soil Micators:	<u></u>	5 <u>8</u>			· · · · · ·				<u></u>		
"Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. *Location: PL-Pore Lining, M-Matrix. Hydric Soil Indicators:											
Type: C-Concentration, D-Dopletion, RM-Reduced Matrix, MS-Masked Sand Grains. *location: Placetining, M-Matrix, Hydric Soil Indicators for Problematic Hydric Soils': Hisics (A1) Dark Surface (S2) Indicators for Problematic Hydric Soils': Indicators for Problematic Hydric Soils': Hisics (A2) Dark Surface (S3) (MLRA 117, 149) Indicators for Problematic Hydric Soils': Indicators for Problematic Hydric Soils': Stratified Layers (A5) Depleted Matrix (F3) (MLRA 147, 148) Indicators for Problematic Hydric Soils': Back histic (A3) Depleted Matrix (F3) (MLRA 147, 148) Indicators for Problematic Hydric Soils': Stratified Layers (A5) Depleted Matrix (F3) (MLRA 147, 148) Indicators of Hydrophydic vegetation and vegota for the matrix (F3) Sandy Redvo Dark Surface (F12) Inro Marganese Masses (F12) (LRR N, MLRA 148, 122) *Indicators of hydrophydic vegetation and vegota for the matrix. Restrictive Layer (f observed): Type: Indicators of hydrophydic vegetation and vegota for this area. No Soil Map Unit Data available for this area No Soil Map Unit Data available for this area.											
Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Grains; *Location: PL-Pore Lining, M-Matrix, Indicators; Hydrics Soil Indicators;											
Inter- Indicators:		opcontration D-Do	plation DM-	Poducod Matrix M	S-Mackad S	and Cr	aine	² Location: DI	-Doro Lipin	a M-Motrix	
Image: State Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (A) Image: Control (Control (A) Image: Control (A) Image: Control (A) Image: Control (Control (A) Image: Control (A) Image: Control (A) Image: Control (Control (A) Image: Control (A) Image: Control (A) Image: Control (Control (Control (A) Image: Control (A) Image: Control (A) Image: Control (Control (Contro	Hydric Soil	Indicators:	JIEUUTI, RIVI=	Reduced Maura, M	S=IVIdSKEU Se	anu Gra	diris.		tors for Pro	blematic Hw	tric Soils ³
Inside Biology (N) Image: Control of Contr				Dark Surface	0 (57)				om Muck (A		
Black Histic (A3) Image: Sufface (A3) Image: Sufface (A3) Image: Sufface (A3) Black Histic (A3) Image: Sufface (A4) Image: Sufface (A5) Image: Sufface (A1) Depleted Matrix (F2) Image: Sufface (A12) Image: Sufface (A12) Image: Sufface (A12) Depleted Matrix (F3) Image: Sufface (A12) Image: Sufface (A12) Image: Sufface (A12) Sandy Mucky Mineral (S1) (LRR N) Image: Sufface (F13) (MLRA 136, 142) Image: Sufface (A13, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Umburk Sufface (F13) (MLRA 136, 122) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Umburk Sufface (F13) (MLRA 127, 147) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Umburk Sufface (F13) (MLRA 127, 147) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Umburk Sufface (F13) (MLRA 127, 147) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Umburk Sufface (F13) (MLRA 127, 147) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Sandy Cleyed Matrix (S4) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Image: Sufface (A14, 148) Image: Suff	Histic E	ninedon (A2)			elow Surface	(\$8) (N	AL RA 147	148) 1	nast Prairie I	Redox (A16)	11)
Hydrogen Sulide (A4) □ Loamy Gleyed Matrix (F2) □ Piedmont Floodplain Soils (F19) MLRA 136, 147) □ Depleted Below Dark Surface (F1) □ Depleted Dark Surface (F7) □ Sandy Mucky Mineral (S1) (LRR N, □ Iron-Manganese Masses (F12) (LRR N, □ Umbrits Surface (F13) □ Sandy Kledve (S5) □ Iron-Manganese Masses (F12) (LRR N, □ Umbrits Surface (F13) □ Iron-Manganese Masses (F12) (LRR N, □ Sandy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Sandy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Sandy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Bardy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Bardy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Bardy Kledve (S5) □ Umbrits Surface (F13) (MLRA 136, 122) □ Iron-Manganese Masses (F12) (MLRA 143) □ Iron-Manganese Masses (F12) (MLRA 143) □ Depticed Dark Surface (F13) (MLRA 147	Black H	istic (A3)		Thin Dark Si	urface (S9) (N	ALRA 1	47. 148)		(MLRA 147	. 148)	
□ Stratified Layers (A5) □ Depleted Matrix (F3) □ Output Depleted Matrix (F3) □	Hydrog	en Sulfide (A4)		Loamy Gley	ed Matrix (F2))	,	🗖 Pi	edmont Floc	odplain Soils (F19)
Com Muck (1410) (LRR N) Depleted Dark Surface (F1)	Stratifie	d Layers (A5)		✓ Depleted Ma	atrix (F3)				(MLRA 136	, 147)	
□ Eppleted Below Dark Surface (A12) □ Depleted Dark Surface (F7) □ Other (Explain in Remarks) □ Tarkc Dark Surface (A12) □ Redox Depressions (F8) □ other (Explain in Remarks) □ Sandy Mucky Mineral (S1) (LRR N, □ MiLRA 136, 122) □ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. □ Sandy Redox (S6) □ Red Parent Material (F21) (MLRA 127, 147) □ unless disturbed or problematic. □ Stripped Matrix (S6) □ Red Parent Material (F21) (MLRA 127, 147) □ unless disturbed or problematic. □ Restrictive Layer (if observed): □ Type: □ Depth (inches): □ No □ □ Pert (inches): □ No □ □ □ Remarks: No Soil Map Unit Data available for this area	🔲 2 cm M	uck (A10) (LRR N)		🔲 Redox Dark	Surface (F6)				ery Shallow I	Dark Surface	(TF12)
□ Tack Dark Surface (A12) □ Redox Depressions (F8) □ Sandy Mucky Mineral (S1) (LRR N, □ Indiversions (F8) □ Sandy Redox (S5) □ Durbit: Surface (F13) (MLRA 136, 122) □ and Redox (S5) □ Sandy Redox (S5) □ Durbit: Surface (F13) (MLRA 136, 122) □ and Redox (S5) □ Stripped Matrix (S6) □ Durbit: Surface (F13) (MLRA 127, 147) □ unless disturbed or problematic. Restrictive Layer (If observed): □ Type: □ Depth (inches): □ No □ Perform (inches): □ No □ Remarks: No Soil Map Unit Data available for this area	Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	irk Surface (F	7)			ther (Explain	in Remarks)	
Image: Sandy Mucky Mineral (S1) (LRR N, Mineral 136) Infor-Manganese Masses (F12) (LRR N, Mineral 136, 122) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) Stripped Matrix (S6) Red Parent Material (F21) (MLRA 148) Stripped Matrix (S6) Red Parent Material (F21) (MLRA 147, 147) Restrictive Layer (if observed): Type: Type: Petron Depth (inches): Hydric Soil Present? Yes No	Thick D	ark Surface (A12)		Redox Depr	essions (F8)						
Image: MicRA 139 Image: MicRA 139 <t< td=""><td>Sandy N</td><td>Mucky Mineral (S1) (</td><td>LRR N,</td><td>Iron-Mangar</td><td>nese Masses</td><td>(F12) (</td><td>LRR N,</td><td></td><td></td><td></td><td></td></t<>	Sandy N	Mucky Mineral (S1) (LRR N,	Iron-Mangar	nese Masses	(F12) (LRR N,				
□ Sandy Geyed Math (S4) □ Onlot Onlot Sandy Geyed Math (S6) □ Pedemon Floodphills (S0) (Place (Pla)) (MLRA 148) wetland hydrology must be present, unless disturbed or problematic. Stripped Matrix (S6) □ Red Parent Material (F21) (MLRA 127, 147) wetland hydrology must be present, unless disturbed or problematic. Type: □ Depth (inches): □ Hydric Soil Present? Yes ☑ No □ Remarks: No Soil Map Unit Data available for this area		A 147, 148)		MLRA 13	56) 	DA 12	6 122)	³ lo di	octors of by	draphytic vog	station and
□ Stripped Matrix (S6) □ Red Parent Material (F21) (MLRA 127, 147) unless disturbed or problematic. Type:	Sandy E	Sedox (S5)		Diedmont Fl	ace (FTS) (IVIL oodplain Soils	LKA 13	(MIDA 1/	11101 18) wei	tland hydrold	arophytic vege	recent
Restrictive Layer (if observed): Type:	Stripped	1 Matrix (S6)		Red Parent	Material (F21)) (MLR	A 127, 14	7) uni	ess disturbe	d or problema	tic.
Type:	Restrictive	Layer (if observed)	:			,		1		F	
Depth (inches):	Type:										_
Remarks: No Soil Map Unit Data available for this area	Depth (in	iches):						Hydric Soil	Present?	Yes 🗸	
No Soil Map Unit Data available for this area	Remarks:							3			
	N	lo Soil Map Unit	Data avai	lable for this are	ea						

US Army Corps of Engineers

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	3.88''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	f year? Yes 🔽 No 🔄 (If no, explain in Remarks.)
Are Vegetation Soil , or Hydrology significan	ntly 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 showi	ng sampling point locations, transects, important features, etc.
Hydrophylic Vegelauon Present? Yes Voc No	Is the Sampled Area
Wetland Hydrology Present?	
Remarks:	_F
0.19 acre wetland located along NT10 near the northe	ern edge of the study area
	ern edge of the study area
Hitbrologi	Consider the disator (minimum of two waying)
Drimony Indicators (minimum of one is required, sheek all that appl	Secondary indicators (minimum of two required)
	Sunace Soli Cracks (B6)
V Surface Water (A1)	C Plants (B14) ✓ Sparsely Vegetated Concave Surface (B8)
I Hydrogen Science (A2) I Hydrogen Science (A2) I Hydrogen Science (A3)	izosphoros on Living Poets (C3) Moss Trim Linos (B16)
V Saturation (AS)	
Sediment Deposits (B2)	Reduction in Tilled Soils (C6) \checkmark Cravitish Burrows (C8)
Drift Deposits (B3)	Surface (C7)
Algal Mat or Crust (B4)	ain in Remarks)
I Iron Deposits (B5)	\checkmark Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aguitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes 🗹 No 🛄 Depth (inch	nes): <u>2</u>
Water Table Present? Yes 🗹 No 🛄 Depth (inch	nes): 0
Saturation Present? Yes 🖌 No 💭 Depth (inch	nes): 0 Wetland Hydrology Present? Yes 🖌 No 🦲
(includes capillary fringe)	nates provinus inspections) if qualitable.
Describe Recorded Data (stream gauge, monitoring well, aerial pr	וו מימוומטופ.
Remarks:	
Small area with standing water, reat is acturated acily	aurround areas with water table 0,10 inches below ourface
Sinali alea with standing water, rest is saturated son s	suffound creek with water table 0-10 mones below sufface.

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	Absolute	Dominant	Indicator	Dominance Test workshoot
ree Stratum (Plot size:	% Cover	Species?	Status	Number of Deminant Creation
Sweetgum (Liquidambar styraciflua)	10	aponos.	FAC	Number of Dominant Species
Tuliptree (Liriodendron tulipifera)	5		FACIL	$\frac{1}{(A)}$
			1,400	Total Number of Dominant
2 2				Species Across All Strata: <u>3</u> (B)
<u> </u>				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 66% (A/B
	15	= Total Cove	er	Prevalence Index worksheet:
E00/ oftetal equary		total anyon		Total % Cover of: Multiply by:
50% of total cover:	20% 01	total cover:		OBL species x 1 =
apling Stratum (Plot size:)	~			FACW species x 2 =
Green Asn (Fraxinus pennsylvanica)	3		FACVV	FAC species x 3 =
Pawpaw (Asimina triloba)	2		FAC	FACIL species x 4 -
Sweetgum (Liquidambar styraciflua)	2		FAC	
Flowering Dogwood (Cornus florida)	2		FACU	OPL species X 5 =
				Column Totals: (A) (B)
			di ta	Prevalence Index - B/A -
	q			Frevalence index = D/A =
		= Total Cove	51	Hydrophytic vegetation indicators:
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
hrub Stratum (Plot size:)				2 - Dominance Test is >50%
				3 - Prevalence Index is ≤3.0 ¹
				4 - Morphological Adaptations ¹ (Provide supportin
	·			data in Remarks or on a separate sheet)
2	·			Problematic Hydrophytic Vegetation ¹ (Explain)
	-		<u> </u>	a and a final and a second the second final second se
				¹ Indicators of hydric soil and wotland hydrology must
				be present, unless disturbed or problematic.
		= Total Cove	er	Definitions of Five Vegetation Strata
E00/ of total cover:	20% of	total aquar		Bennaons of the vegetation statta.
50% of total cover:	20% 01	total cover:		Tree – Woody plants, excluding woody vines,
<u>lerb Stratum</u> (Plot size:)	05	-		approximately 20 ft (6 m) or more in height and 3 in.
Stilt Grass (Microstegium vimineum)	25	<u> </u>	FAC	(7.6 cm) of larger in diameter at breast height (DBH).
Periwinkle (Vinca minor)	25	<u>D</u>		Sapling – Woody plants, excluding woody vines,
Poison Ivy (Toxicodendron radicans)	25	D	FAC	approximately 20 ft (6 m) or more in height and less
Spotted Lady's-Thumb (Persicaria maculosa)	10		FACW	than 3 in. (7.6 cm) DBH.
Stiff Cowbane (Oxypolis rigidior)	2		OBL	Shrub Woody plants excluding woody vines
Lady Fern (Athyrium asplenioide)	2	<u> </u>	FAC	approximately 3 to 20 ft (1 to 6 m) in height.
Soft ruch (lungue officius)	2		FACIAL	
	<u> </u>		FACW	Herb – All herbaceous (non-woody) plants, including
<u> </u>				herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3
				ft (1 m) in height.
0				
1.				Woody vine – All woody vines, regardless of height.
	92	- Total Cov		
10			40.4	
50% of total cover: 40	20% of	total cover:	18.4	
Voody Vine Stratum (Plot size:)				
			·	
				Hydrophytic
		= Total Cove	er	Vegetation
50% of total cover:	20% of	total cover:		Present? Yes Ves No
emarks: (Include photo numbers here or on a constate s	neeri			
Remarks: (Include photo numbers here or on a separate s	neet.)	if not he	roph:+i-	for Dominance Toot

Samo	lina	Point.	NT ²	10-/	4
Samo		POIL			- 2

Profile Description: (Descripte to the depth needed to document the indicator or confirm the absence of indicators.) Redox Features: Internal intern
Depth Inches) Matrix Redox Features 0-1 10YR 4/1 100 IoYR 2/1 5 D M SiL 1-12 10YR 5/2 90 10YR 2/1 5 D M SiL Image: Solution of the soluti
Index) Color (most) % Type: Lec' Texture Remarks 112 10YR 4/1 100 10YR 5/2 90 10YR 2/1 5 D M SiL 112 10YR 5/2 90 10YR 5/6 5 C M M M 112 10YR 5/6 5 C M <td< td=""></td<>
U-1 10YR 4/1 100 1-12 10YR 5/2 90 10YR 5/6 5 C M Image: Interpret Lines
1.12 10YR 5/2 90 10YR 2/1 5 D M SIL 10YR 5/6 5 C M SIL SIL SIL 10YR 5/6 5 C M SIL SIL SIL 11 10YR 5/6 5 C M SIL SIL 11 11 11 11 SIL
10YR 5/6 5 C M Image: Solid Solid Actions: Image: Solid Actionsolid Actionsolid Actionsolid Actions:
"Type: C-Concentration, D=Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. *Location: PL=Pore Lining, M=Matrix. Hydric Soll Indicators:
Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. ³ Location: PL-Pore Lining, M-Matrix. Hydric Soil Indicators: Indicators for Problematic Hydric Soils Histosel (A1) Dark Surface (S7) Black Histic Epipedon (A2) Dark Surface (S9) (MLRA 147, 148) Black Histic (A3) Dark Surface (S9) (MLRA 147, 148) Dydrogen Sulfide (A4) Depleted Matrix (F2) MLRA 147, 148) Depleted Matrix (F2) Om Muck (A10) (LRR N) Depleted Matrix (F3) Brady Mucky Mineral (S1) (LRR N, Depleted Matrix (F2) MLRA 147, 148) Depleted Matrix (F3) Sandy Kedxy (S5) Depleted Matrix (S4) Depleted Matrix (S6) Depleted Matrix (S6) Sandy Kedxy (S5) Depleted Matrix (S4) Depleted Matrix (S6) Depleted Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) "Indicators of hydrophytic vegetation and wetand hydrology must be present, unless disturbed or problematic. Type: Depleted Matrix (S6) Hydric Soil Present? Yes No No
¹ Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. ² Location: PL-Pore Lining, M-Matrix. Hydric Solil Indicators: Indicators: Indicators for Problematic Hydric Solis Histosol (A1) Dark Surface (S7) Indicators for Problematic Hydric Solis Histosol (A1) Dark Surface (S9) (MLRA 147, 148) Coast Praine Redox (A10) (MLRA 147, 148) Black Histic (A3) Thin Dark Surface (F3) Indicators for Problematic Hydric Solis Hydrog Sulfide (A4) Depleted Matrix (F3) Indicators for Problematic Hydric Solis Standy Redox (130) (MLR N) Redox Dark Surface (F1) Ince Antra (F1) Bepleted Below Dark Surface (A11) Depleted Matrix (F3) Intro Amagnamese Masses (F12) (LRR N, MLRA 147, 148) Indicators of hydrophytic vegetation and vetland hydrology must be present, unless disturbed or problematic. Sandy Cledav (S5) Red Parent Material (F2) (MLRA 148, 122) ³ Indicators of hydrophytic vegetation and vetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Hydric Soil Present? Yes No No Remarks: No Soil Map Unit Data available for this area
I*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ?Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators: Indicators (or Problematic Hydric Soils? Indicators for Problematic Hydric Soils? Histic Eppeden (A2) Dark Surface (S3) (MLRA 147, 148) MIRA 147, 149 Hydrigen Sulfate (A4) Dark Surface (F3) Case Traine Redox (A16) Straffied Layers (A5) Depleted Matrix (F3) Perform Ecdos (A17) Depleted Below Dark Surface (A17) Redox Dark Surface (F17) MIRA 147, 148) MuRA 147, 148) Depleted Matrix (F3) WIRA 136, 122) Sandy Medva (S1) Depleted Matrix (S1) Perform Surface (F12) MuRA 147, 148) Untorn. Surface (F13) "Indicators of hydrophytic vegetation and wetand hydrology must be present, unless disturbed or problematic. Sandy Kedox (S5) Perform Floodplain Solis (F19) (MLRA 142, 147) "Indicators of hydrophytic vegetation and wetand hydrology must be present, unless disturbed or problematic. Type: Depleted Matrix (S4) Hydric Soil Present? Yes Murch 147, 1489 Hydric Soil Present? Yes No Sandy Kedox (S5) Perform Ecdoplain Soils (F19) (MLRA 142, 142) "Indicators of hydrophytic vegetation and wetand hydrology must be present, unless disturbe
**Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. **Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators:
*Type: C-Concentration, D-Depletion, RM-Reduced Matrix, MS-Masked Sand Grains. *Location: PL=Pore Lining, M-Matrix. Hydric Soil Indicators:
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators:
**Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. *Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators:
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, IMS=Masked Sand Grans. ² Location: PL=Pore Lining, M=Matrix. Hydric Soil Indicators: Histosol (A1) Dark Surface (S7) Indicators for Problematic Hydric Soils ² Histosol (A1) Dark Surface (S9) (MLRA 147, 148) Coast Prainte Redox (A10) (MLRA 147) Hydrigen Sulfide (A4) Damy Gleyed Matrix (F2) MLRA 147, 148) Depleted Bleow Dark Surface (A12) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) Sandy Mucky Mineral (S1) (LRR N, MLRA 136, 122) Wry Shallow Dark Surface (F12) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Type: Depleted Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Hydric Soil Present? Yes No Remarks: No Soil Map Unit Data available for this area
J):Doc Construction, Doc Data Indicators, Doc Data Hydric Soil Indicators, Construction, Incomposition, Incompositer, Incomposition, Incomposition, Incomposition, Inc
Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147, 147) Histic Epipedon (A2) Dolyvalue Below Surface (S9) (MLRA 147, 148) Coast Praine Redox (A16) Black Histic (A3) Donary Gleged Matrix (F2) Coast Praine Redox (A16) 2 cm Muck (A10) (MLRA 137, 148) Dolyvalue Below Surface (S9) (MLRA 147, 148) Depleted Below Dark Surface (A11) Depleted Matrix (F2) (MLRA 136, 147) Sandy Mucky Mineral (S1) (LRR N, MLRA 136) Redox Depressions (F4) (MLRA 136, 142) Sandy Gleged Matrix (S6) Umbric Surface (F13) (MLRA 136, 122) Other (Explain in Remarks) Stripped Matrix (S6) Winch Floodplain Solis (F19) (MLRA 127, 147) ³ Indicators of hydrophytic vegetation and welland hydrology must be present, unless disturbed or problematic. Type:
Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Coast Prairie Redox (A16) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) MLRA 136, 147) Depleted Below Dark Surface (A11) Depleted Dark Surface (F7) MLRA 136, 147) Depleted Below Dark Surface (A12) Redox Dark Surface (F7) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, MLRA 136) Sandy Gleyed Matrix (S4) Urbnic Surface (F13) (MLRA 135, 122) Piedmont Floodplain Soils (F19) (MLRA 147) Sandy Gleyed Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type:
Black Histic (A3) ☐ Thin Dark Surface (S9) (MLRA 147, 148) ☐ MLRA 147, 148) ☐ Hydrogen Suffide (A4) ☐ Loamy Cleved Matrix (F2) [MLRA 136, 147) ☐ 2 cm Muck (A10) (LRR N) ☐ Redox Dark Surface (F6) [MLRA 136, 147) ☐ Depleted Below Dark Surface (A11) ☐ Depleted Dark Surface (F7) [Depleted Matrix (F4)] [MLRA 147, 148) ☐ Sandy Gleved Matrix (S4) ☐ Loamy Clever (F13) [MLRA 136, 147) [Depleted Matrix (F4)] ☐ Sandy Gleved Matrix (S6) [From-Manganese Masses (F12) (LRR N, MLRA 136, 147) [Depleted Matrix (S6)] [Depleted Matrix (S7)] ☐ Sandy Gleved Matrix (S6) [Predmont Floodplain Soils (F19) (MLRA 147, 148) [Predmont Floodplain Soils (F19) (MLRA 147, 148) ☐ Sandy Gleved Matrix (S6) [Predmont Floodplain Soils (F19) (MLRA 127, 147) [Predmont Floodplain Soils (F19) (MLRA 127, 147) Restrictive Layer (if observed): Trom-Manganese Masses [Predmont Floodplain Soils (F19) (MLRA 127, 147) [Predmont Floodplain Soils (F19) (MLRA 127, 147) [Predmont Floodplain Soils (F19) (MLRA 127, 148)] ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. [Prestrictive Layer (If observed): [Predmont Floodplain Soils (F19) (MLRA 127, 147)] [Predmont Floodplain Soils (F19) (MLRA 127, 147)] Remarks: [Prestrictive
□ Hydrogen Sulfide (A4) □ Loarny Gleyed Matrix (F2) □ Piedmont Floodplain Soils (F19) □ Stratified Layers (A5) □ Depleted Matrix (F3) □ MLRA 136, 147) □ Depleted Below Dark Surface (A11) □ Depleted Dark Surface (F7) □ Other (Explain in Remarks) □ Sandy Mucky Mineral (S1) (LRR N, □ Innon-Manganese Masses (F12) (LRR N, □ ■ Sandy Gleyed Matrix (S4) □ Umbric Surface (F13) (MLRA 136, 122) □ □ □ Sandy Gleyed Matrix (S6) □ Umbric Surface (F13) (MLRA 136, 122) □ □ □ Stripped Matrix (S6) □ Umbric Surface (F13) (MLRA 127, 147) unless disturbed or problematic. Type:
Stratified Layers (A5) Z cm Muck (A10) (LRR N) Depleted Matrix (F3) Depleted Dark Surface (A11) Depleted Dark Surface (F7) Depleted Dark Surface (A12) Depleted Dark Surface (F1) Deplet
□ □
Thick Dark Surface (A12) Redox Depressions (F3) Redox Depressions (F3) Redox Depressions (F3) Redox Depressions (F3) MLRA 147, 148) MLRA 136, Umbric Surface (F13) (MLRA 136, 122) Sandy Redox (S5) Predmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type:
□ Sandy Mucky Mineral (S1) (LRR N, □ Iron-Manganese Masses (F12) (LRR N, □ MLRA 147, 148) □ Umbric Surface (F13) (MLRA 136, 122) ³Indicators of hydrophytic vegetation and wetland hydrology must be present, □ Sandy Redvx (S5) □ Piedmont Floodplain Solis (F19) (MLRA 148) wetland hydrology must be present, □ Stripped Matrix (S6) □ Red Parent Material (F21) (MLRA 127, 147) unless disturbed or problematic. Restrictive Layer (if observed): Type:
MLRA 147, 148) MLRA 136) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Ssripped Matrix (S6) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type:
Sandy Gleyed Matrix (S4) □ Umbric Surface (F13) (MLRA 136, 122) Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): □ Red Parent Material (F21) (MLRA 127, 147) unless disturbed or problematic. Type:
Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type:
Image: Subper value (if observed): Type:
Type:
Depth (inches):
Remarks: No Soil Map Unit Data available for this area.
No Soil Map Unit Data available for this area

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, Ran	ge:	
Landform (hillslope, terrace, etc.): Terrace	Local relief (concave, conve	x, none): level/conca	ave Slope (%):
Subregion (LRR or MLRA): Lat:	5°57'24.88''N Long	84°18'32.25''W	Datum:
Soil Map Unit Name:		NWI classific	ation:
Are climatic / hydrologic conditions on the site typical for th	s time of year? Yes 🗾 ✔ No 🗌	📃 (If no, explain in R	emarks.)
Are Vegetation Soil , or Hydrology	significantly disturbed? Are "N	lormal Circumstances" p	oresent? Yes 🖌 No 🦲
Are Vegetation Soil , or Hydrology	naturally problematic? (If nee	ded, explain any answe	rs in Remarks.)
SUMMARY OF FINDINGS – Attach site map	showing sampling point lo	cations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes	Is the Sampled	Area	
Wetland Hydrology Present?		i: res	
Remarks:			
0.63 acre wetland located north of the Haul Ro	ad		
separated from NT10-A by approximately 650	feet of NIT10 that is deeply in	cised	
beparated nonritin to resy approximately bee		sided	
			· · · · · · · · · · · · · · · · · · ·
wetland Hydrology indicators:	1		ators (minimum of two required)
Primary Indicators (minimum of one is required; check all	that apply)	Surface Soll	Cracks (B6)
Surface Water (A1) □ Tru	e Aquatic Plants (B14)	Sparsely Veg	getated Concave Surface (B8)
High Water Table (A2)	lingen Sulfide Odor (C1)	(CO) Drainage Par	tterns (B10)
Saturation (A3)	aized Rhizospheres on Living Roots		Ines (B16)
Water Marks (B1)	sence of Reduced from (C4)	Dry-Season Ory-Season	Water Table (C2)
Drift Denesite (D2)	ent from Reduction in Theu Sons (C)	5) Crayiish Bun	ioible ap Aerial Imagany (CO)
Diffit Deposits (B3) Introduction Crucit (D4)	ar (Explain in Demarka)		tracead Dianta (D1)
	er (Explain in Remarks)		Desition (D2)
Inundation Visible on Aerial Imagery (B7)			it ard (D3)
Water-Stained Leaves (B9)			anhic Relief (D4)
Aquatic Fauna (B13)		EAC-Neutral	Test (D5)
Field Observations:			1000 (200)
Surface Water Present? Yes ✓ No De	pth (inches): 2		
Water Table Present? Ves V No De	pth (inches): 0		
Soturation Dracont? Voc V	pth (inches): 0	and Hudrology Procor	
(includes capillary fringe)	pur (incries): <u> </u>	and Hydrology Preser	
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 co	ompared to NT9-A,	D10W, and NT11-A

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EGETATION (Five Sulata) – Ose scientino ha		Junto.		
(marked (Distribution))	Absolute	Dominant	Indicator	Dominance Test worksheet:
Red Maple (Acer rubrum)		<u>Species?</u>		Number of Dominant Species
Green Ash (Fravinus pennsylvanica)	20	<u> </u>	EACIA	That are OBL, FACW, of FAC: _/ (A
			FACIV	Total Number of Dominant
				Species Across All Strata: _/ (B
		<u> </u>		Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100 (A
·				Prevalence Index worksheet:
	60	= Total Cov	er	Tatal % Caver of Multiply by
50% of total cover: 30	20% of	total cover:	12	ODL spasies
Sapling Stratum (Plot size:)				CACIM experies X1 =
-				FACW species X2 =
				FAC species X 3 =
				FACU species X 4 =
				UPL species x 5 =
				Column Totals: (A) (
·				Dravalanca Index - P/A
				Prevalence index = b/A =
			er	
50% of total cover:	20% of	total cover:	;	
shrub Stratum (Plot size:)	1010		122012 1020	2 - Dominance Test is >50%
Sweetgum (Liquidambar styraciflua)	10	<u>D</u>	FAC	3 - Prevalence Index is ≤3.0
Spicebush (Lindera benzoin)	10	<u>D</u>	FAC	4 - Morphological Adaptations' (Provide suppor
Green Ash (Fraxinus pennsylvanica)	10	D	FACW	Drahlematia Undranhutia Vegetatian ¹ (Evaluin)
Ironwood (Carpinus caoliniana)	5		FAC	
				be present, unless disturbed or problematic.
	35	= Total Cov	er	Definitions of Five Vegetation Strata
50% of total cover: 17.5	20% of	total cover-	7	Seminoris of the regention of the
Aerb Stratum (Diot size:		total cover.		Tree – Woody plants, excluding woody vines,
Poison Ivy (Toxicodendron radicans)	20	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH)
Stilt Grass (Microstegium vimineum)	10		FAC	
lewelweed (Impatiens capensis)	15		FACW	Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less
Cherokee Sedge (Carey cherokeensis)	5		FACIN	than 3 in. (7.6 cm) DBH.
Sallow Sedge (Carex Jurida)	15			
Spotted Lady's Thump (Dereinaria magulass	5			Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in beight
Spotted Lady S- mumb (Persidana madulose	5			approximately 5 to 20 ft (1 to 5 ft) in height.
Spike Rush (Eleochans palustris)	5			Herb – All herbaceous (non-woody) plants, including
Typna sp	<u> </u>		OBL	plants, except woody vines, less than approximately
Fringed Sedge (Carex crinita)	10		OBL	ft (1 m) in height.
0. Leathery Rush (Juncus coriaceus)	5		FACW	Woody vine All woody vines regardless of height
1. Bulbous Bittercress (Cardamine bulbosa)	3		OBL	woody vine – Air woody vines, regardless of height
	98	= Total Cov	er	
50% of total cover: 49	20% of	total cover:	19.6	
Voody Vine Stratum (Plot size:)				
, () () () () () () () () () () () () ()				
			0 	
			2.	
;				Hydrophytic
		= Total Cov	er	Vegetation
	101010101	113 11 11		Present? Yes V NO
50% of total cover:	20% of	total cover:	<u> </u>	

Sampling Point NT10-B

Depth							2 · 1 ·
Depth	ription: (Describe	to the de	oth needed to docu	iment the indic	ator or confirm	1 the absence	e of indicators.)
(Inches)	Color (moist)	%	Color (moist)	lox Features % Tv	pe ¹ Loc ²	Texture	Remarks
0-7	2.5Y 6/2	40	5Y 5/2	45			near point 20
	-		10YR 5/3	10			÷
	-89		10YR 5/6	5		×	.
ж алана са				- <u> </u>			
0-4	10YR 6/1	35	10YR 4/2	45			second sample within powerl
			10YR 5/6	10			
1	-		10YR 3/1	5			
· · · · · · · · · · · · · · · · · · ·			10YR 5/1	5		•	-
4-8	Gley1 4/1	100					
¹ Type: C=Co	oncentration, D=Dep	bletion, RM	I=Reduced Matrix, N	//S=Masked Sar	d Grains.	² Location: F	L=Pore Lining, M=Matrix.
Hydric Soil I	Indicators:					Indic	ators for Problematic Hydric Soils ³ :
Histosol	(A1)		🔲 Dark Surfac	ce (S7)		 2	2 cm Muck (A10) (MLRA 147)
Histic Ep	bipedon (A2)		Polyvalue E	Below Surface (S	8) (MLRA 147,	148)	Coast Prairie Redox (A16)
	stic (A3) on Sulfide (A4)		Loamy Clev	Surface (S9) (ML wed Matrix (E2)	.RA 147, 148)		(MLRA 147, 148) Diadmont Elondolain Soils (E19)
Stratified	1 Layers (A5)		Depleted M	atrix (F3)			(MLRA 136, 147)
🔲 2 cm Mu	ick (A10) (LRR N)		🔲 Redox Darl	Surface (F6)			/ery Shallow Dark Surface (TF12)
Depletec	d Below Dark Surfac	e (A11):	Depleted D	ark Surface (F7)			Other (Explain in Remarks)
Sandy M	ark Surface (A12) Aucky Mineral (S1) (Redox Dep	ressions (F8) nece Masses (F	12) (I DD N		
	147, 148)	LICIC IN,	MLRA 1	36)			
🔲 Sandy G	leyed Matrix (S4)		Umbric Sur	face (F13) (MLF	RA 136, 122)	³ Inc	dicators of hydrophytic vegetation and
Sandy R	Redox (S5)		Piedmont F	loodplain Soils (F19) (MLRA 1 4	18) w	etland hydrology must be present,
Stripped	Matrix (S6)		Red Parent	Material (F21)	MLRA 127, 14	7) ur	iless disturbed or problematic.
Type:	Layer (il observed)	•					
Denth (inc	ches).					Hydric Soi	I Present? Yes 🗸 No
Remarks:		128 12	1000 101 02 85 860 10			- injunio doi	
No	o Soil Map Unit I	Data ava	ailable for this ar	ea			

US Army Corps of Engineers

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°5/	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 signific	cantly disturbed? Are "Normal Circumstances" present? Yes 🔽 No
Are Vegetation, Soil, or Hydrology natura	Illy problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map sho	wing sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes Vegetation	Is the Sampled Area
Hydric Soil Present? Yes 🖌 No	within a Wetland? Yes 🗸 No 🛄
Wetland Hydrology Present? Yes 🖌 No	
Remarks:	
0.68 acre forested wetland south of Bear Creek Ros	ad
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that a	pply) 📃 Surface Soil Cracks (B6)
Surface Water (A1)	atic Plants (B14)
High Water Table (A2)	i Sulfide Odor (C1) 🛛 🗹 Drainage Patterns (B10)
Saturation (A3)	Rhizospheres on Living Roots (C3)
Water Marks (B1)	of Reduced Iron (C4) Dry-Season Water Table (C2)
Sediment Deposits (B2)	on Reduction in Tilled Soils (C6)
Drift Deposits (B3)	k Surface (C7) Saturation Visible on Aerial Imagery (C9)
	plain in Remarks) Stunted of Stressed Plants (D1)
Inundation Visible on Aprial Imagery (P7)	Geomorphic Position (D2)
Mater Stained Leaves (B0)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No 🗸 Depth (ir	nches):
Water Table Present? Yes Vo Depth (ir	nches); 5
Saturation Present? Yes 🖌 No 💭 Depth (ir	nches): 3 Wetland Hydrology Present? Yes 🗸 No
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial	photos, previous inspections), if available:
Remarks:	
wetland baging along the couthernmost partice of N	IT10 before the tributery amptice into Deer Creak. This is the wettest
portion of the wetland. The wetland then spreads of	ut east and west along the rinarian zone of Bear Creek. Drainage
patterns and varying degrees of soil moisture have	created a wetland with varving wetland characteristics.
, , , , , , , , , , , , , , , , , , , ,	

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VEGETATION	l (Five Strata) -	 Use scientific 	names of	plants.
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Sampling Point: NT10-C

Tee Stratum (Plot size:		Absolute	Dominant	Indicator	Dominance Test worksheet:	2019
1. SWeegum (Liquidamoet syntaminal supress Arross All Strata supress Arross Arross All Strata supress Arross Arross Arross Arross supress Arross Arross Arross supress Arross Arross Arross supress Arross Arross Arross supress Arross Arross supress Arross Arross supress Arross Arross Arross supress Arross sup	Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species	
2. Ease Int CollorWood (POPULIS definitions) FAC 3. Sugar Maple (Acer saccharum) 5 5 FAC 8. Lend Marker of Dominant Species 100 (ARB) 9 35 FAC 9 35 FAC 1 35 FAC 50% of total cover. 100 (ARB) 1 36 Total Number of Dominant Species 100 (ARB) 2 36 Total Number of Dominant Species x1 1 50% of total cover. 7 FAC Species Across At 3 - 1 1	1. Sweetgum (Liquidambar styracifiua)	20	<u> </u>	FAC	That Are OBL, FACW, or FAC: 3	(A)
3. Sugar Mapple (Ader Saccharum) 3	2. Eastern Cottonwood (Populus deltoids). FAC	5		FAC	Total Number of Dominant	
4. record (Certics calladueltsis) 9	3. Sugar Maple (Acer saccharum)	5		FACU	Species Across All Strata: <u>3</u>	(B)
6. 35 = Total Cover 5. 50% of total cover: 2. 7 2. 7 3. 7 3. 7 4. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 6. 7 5. 7 5. 7 5. 7 5. 7 5. 7 5. 7 6. 7 1. 8 6. 7 7 7	4. Redbud (Cercis carladerisis) 5	<u> </u>		FACU	Percent of Dominant Species That Are OBL, FACW, or FAC: 100	(A/B)
35 = Total Cover 50% of total cover: 17.5 20% of total cover. 7 2	6			· <u> </u>		
50% of total cover: 17.5 20% of total cover: 7 Ottal score Ottal score Ottal score FACU species x 1 =		35	= Total Cov	er	Prevalence Index worksneet:	
Saping Stratum (Plot size:	50% of total cover: <u>17.5</u>	20% of	total cover:	7	OBL species x1 -	
1	Sapling Stratum (Plot size:)				EACM species x2 =	_
2 A =	1				EAC species X2 =	_
3.	2				FACU species v4 -	_
4	3				IIDI species X4	_
5.	4	<u>.</u>			Column Totals: (A)	— (B)
6.	5					_ (D)
	6				Prevalence Index = B/A =	_
50% of total cover:			= Total Cov	er	Hydrophytic Vegetation Indicators:	
Stratum (Plot size:) 20 D FAC 2.	50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation	
1. Spicebush (Lindera benzoin) 20 D FAC III 3 Providence Index is 3.0° 2.	Shrub Stratum (Plot size:)				✓ 2 - Dominance Test is >50%	
2	1. Spicebush (Lindera benzoin)	20	D	FAC	3 - Prevalence Index is ≤3.0 ¹	
3.	2			· <u> </u>	4 - Morphological Adaptations ¹ (Provide sup	porting
4	3	. <u> </u>			Droblomatic Hydrophytic Vogotation ¹ (Explain	n)
5.	4					10
6.	5		. <u> </u>		¹ Indicators of hydric soil and wotland hydrology p	nuct
	6			10 1 - 1 1	be present, unless disturbed or problematic.	lust
50% of total cover: 20% of total cover: 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). 2. Jewelweed (Impatiens capensis) 20 FACW 3. Doison Ivy (Toxicodendron radicans) 15 FAC 4. Agrimony (Agrimonia parviflora) 5 FACW 5.			= Total Cov	er	Definitions of Five Vegetation Strata:	
Heb Stratum (Plot size:) 1. Sharp-Scale Sedge (Carex oxylepis) 50 D FACW (7.6 cm) or larger in diameter at breast height (DBH). 2. Jewelweed (Impatiens capensis) 20 FACW (7.6 cm) or larger in diameter at breast height (DBH). 3. Poison Ivy (Toxicodendron radicans) 15 FAC sapiroximately 20 ft (6 m) or more in height and 3 in. 4. Agrimony (Agrimonia parviflora) 5 FACW sapiroximately 20 ft (6 m) or more in height and less 5. FACW 5 FACW sapiroximately 20 ft (6 m) or more in height and less 6.	50% of total cover:	20% of	total cover:		Tree Weedy plants evoluting weedy vines	
1. Sharp-Scale Sedge (Carex oxylepis) 50 D FACW (7.6 cm) or larger in diameter at breast height (DBH). 2. Jewelweed (Impatiens capensis) 20 FACW FACW Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in (7.6 cm) DBH. 4. Agrimony (Agrimonia parviflora) 5 FACW Sapling - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height. 7	Herb Stratum (Plot size:)				approximately 20 ft (6 m) or more in height and 3	in.
2. Jewelweed (Impatiens capensis) 20 FACW Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH. 3. Poison Ivy (Toxicodendron radicans) 15 FACW Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH. 5	1. Sharp-Scale Sedge (Carex oxylepis)	50	<u>D</u>	FACW	(7.6 cm) or larger in diameter at breast height (DI	BH).
3. Poison Ivy (Toxicodendron radicans) 15 FAC approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH. 4. Agrimony (Agrimonia parviflora) 5 FACW shan 3 in. (7.6 cm) DBH. 5.	2. Jewelweed (Impatiens capensis)	20		FACW	Sapling – Woody plants, excluding woody vines,	
4. Agrimony (Agrimonia parviflora) 5 FACW Intern 3 ift. (7.6 cm) DBrt. 5.	3. Poison Ivy (Toxicodendron radicans)	15		FAC	approximately 20 ft (6 m) or more in height and le	ess
5	4. Agrimony (Agrimonia parviflora)	5		FACW	than 3 In. (7.6 cm) DBH.	
6	5			· <u> </u>	Shrub – Woody plants, excluding woody vines,	
7	6				approximately 3 to 20 ft (1 to 6 m) in height.	
8	7				Herb - All herbaceous (non-woody) plants, inclue	ding
9.	8		3	·	plants, except woody vines, less than approximat	telv 3
10	9	N			ft (1 m) in height.	enous u enou
11. 90 = Total Cover 50% of total cover: 45 20% of total cover: 18 Woody Vine Stratum (Plot size:)	10				Woody vine - All woody vines, regardless of hei	aht.
30 = 1 otal Cover 50% of total cover: 45 20% of total cover: 18 Woody Vine Stratum (Plot size:)	11	00	-			-
50% of total cover: 45 20% of total cover: 18 Woody Vine Stratum (Plot size:)	15	30	= Total Cov	er		
Woody Vine Stratum (Plot size:) 1	50% of total cover: 45	20% of	total cover:	18		
1	Woody Vine Stratum (Plot size:)					
2	1		·			
3	2					
4	3					
5.	4					
	5				Hydrophytic	
50% of total cover: 20% of total cover: reservent:			= Total Cov	er	Vegetation Present? Vec V	
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	50% of total cover:	20% of	total cover:			
boundary is difficult to determine. presence of C oxylepis was one of the main determining factors	Remarks: (Include photo numbers here or on a separate s	heet.)		Marco Corre		
	boundary is difficult to determine. presence of C	; oxylepis	was one	of the m	nain determining factors	

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			NIT	100
Samn	lina	Point	IN I	10-0

SOIL								Sampling	g Point: <u>INT 10-C</u>
Profile Des	cription: (Describe	to the dep	oth needed to docur	nent the i	ndicator	or confirn	n the absence	of indicators.)	
Depth	Matrix		Redo	x Feature	s				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Rema	arks
0-2	10YR 5/3	100	8				<u></u>	<i>2</i> -	
2-10	10YR 5/2	98	10YR 5/6	2	С	М	SiL		
2					12			di.	
<u>,</u>	5 x				0				
	8 8		;			· <u> </u>			
	-88 -9 <u>6</u> -				8				
-									
-	- 5 -								
8	÷ +		÷				-		
	31 .				12				
	- 11 11				0				
¹ Type: C=C	Concentration, D=De	oletion, RM	=Reduced Matrix, M	S=Masked	I Sand Gr	ains.	² Location: PL	=Pore Lining, M=Ma	atrix.
Hydric Soil	Indicators:		_				Indica	tors for Problemati	ic Hydric Soils ³ :
Histosc	ol (A1)		Dark Surface	e (S7)			20	cm Muck (A10) (MLI	RA 147)
Histic E	pipedon (A2)		Polyvalue Be	elow Surfa	ce (S8) (M	/LRA 147,	148) 📙 Co	oast Prairie Redox (/	416)
Black F	listic (A3)		Thin Dark Su	urface (S9) ad Matrix ((MLRA 1	47, 148)	Пр	(MLRA 147, 148)	Colle (E10)
Stratifie	en Sullide (A4)		Depleted Ma	ed Matrix (trix (E3)	FZ)			(MIRA 136 147)	Solis (F 19)
\square 2 cm M	luck (A10) (LRR N)		Redox Dark	Surface (F	6)		🗖 Ve	erv Shallow Dark Su	rface (TF12)
Deplete	ed Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	(F7)		🗖 Ot	her (Explain in Rem	arks)
🔲 Thick D	Oark Surface (A12)		🔲 Redox Depre	essions (F	8)				
Sandy Sandy	Mucky Mineral (S1) (LRR N,	Iron-Mangan	ese Mass	es (F12) (LRR N,			
	A 147, 148)		MLRA 13	6) (F12)			31	C bendere bender	
Sandy Sandy	Gleyed Matrix (S4)			ace (FI3) I podplain S	NILRA 13	(MIDA 1/	indi wot	cators of nydropnytic	c vegetation and
	d Matrix (S6)		Red Parent I	Material (F	21) (MI R	A 127. 14	7) unle	ess disturbed or prof	hlematic
Restrictive	Layer (if observed)	:		natorial (i					bronnatio.
Type:								<u> </u>	
Depth (ir	nches):						Hydric Soil	Present? Yes	
Remarks:							,		
N	lo Soil Map Unit	Data ava	ilable for this are	a					

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 significan	illy disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation Soil , or Hydrology naturally	problematic? (If needed, explain any answers in Remarks.)
	La (12019/99/2-2000/00/2019/2019/2019/2019/2019/2019/20
SUMMARY OF FINDINGS – Attach site map showin	ng sampling point locations, transects, important features, etc.
Hydrophytic Vogetation Present?]]
Hydrophytic Vegetation Present?	Is the Sampled Area within a Wetland? Yes ✓ No
Wetland Hydrology Present? Yes V	1
Remarks:	<u></u>
0.14 acre wetland	
disconnected from D10W-B by gravel road	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply	y) Surface Soil Cracks (B6)
Surface Water (A1)	Plants (B14) Sparsely Vegetated Concave Surface (B8)
Image: Image of the second	ulfide Odor (C1) ↓ Drainage Patterns (B10)
Saturation (A3)	izospheres on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1)	Reduced Iron (C4) Dry-Season Water Table (C2)
Sediment Deposits (B2)	Reduction in Tilled Soils (C6) Crayfish Burrows (C8)
Drift Deposits (B3)	urface (C7) Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	in in Remarks)
I Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Aquetie Found (B12)	
	PAC-Neutral Test (D5)
Field Observations:	
Surface water Present? Yes V log Depth (inch	es): <u></u>
Water Table Present? Yes V No Depth (inch)	
Saturation Present? Yes ✓ No Depth (inche (includes capillary fringe)	es): 0 Wetland Hydrology Present? Yes V No
Describe Recorded Data (stream gauge, monitoring well, aerial pho	otos, previous inspections), if available:
Remarks:	
hydrology comes from D10W, and it widens as it reach	hes a gravel well access road

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/EGETATION (Five Strata) – Use scientific na	ames of j	plants.		Sampling Point: D10W-A			
	Absolute	Dominant	Indicator	Dominance Test worksheet:			
<u>Tree Stratum</u> (Plot size:)	% Cover	<u>Species?</u>	Status	Number of Dominant Species			
1. Sweetgum (Liquidambar styracinua)	20	<u> </u>	FAC	That Are OBL, FACW, or FAC: <u></u> (A)			
2. Red Maple (Acer rubrum)	20	<u> </u>	FAC	Total Number of Dominant			
3	<u> </u>			Species Across All Strata: <u>5</u> (B)			
4			. <u> </u>	Demonst of Deminant Creation			
5.				That Are OBL_EACW or EAC· 100 (Δ/			
).			102 D.				
	40	- Total Cov	or	Prevalence Index worksheet:			
20		- 10001001	0	Total % Cover of:Multiply by:			
50% of total cover: 20	20% of	total cover:	0	OBL species x 1 =			
Sapling Stratum (Plot size:)				FACW species x 2 =			
				FAC species x 3 =			
<u>.</u>			. <u> </u>	EACLI species x1 -			
				OPL species X 5 =			
				Column Totals: (A) (E			
1				Drovalance Index - P/A			
	-						
		= Total Cov	er	Hydrophytic vegetation indicators:			
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation			
Shrub Stratum (Plot size:)				2 - Dominance Test is >50%			
Sweetgum (Liquidambar styraciflua)	15	D	FAC	3 - Prevalence Index is ≤3.0 ¹			
2. Ironwood (Carpinus caoliniana)	5		FAC	4 - Morphological Adaptations ¹ (Provide supporti			
2 Green Ash (Fraxinus pennsylvanica)	5		FACW	data in Remarks or on a separate sheet)			
Elowering Dogwood (Cornus florida) FACU	5		FACU	Problematic Hydrophytic Vegetation ¹ (Explain)			
0				¹ Indicators of hydric soil and wetland hydrology must			
ð				be present, unless disturbed or problematic.			
	30	= Total Cov	er	Definitions of Five Vegetation Strata:			
50% of total cover: 15	20% of	total cover:	6				
Herb Stratum (Plot size:				Tree – Woody plants, excluding woody vines,			
Poison Ivy (Toxicodendron radicans)	40	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH).			
Stilt Grass (Microstegium vimineum)	20	<u> </u>	FAC	(, , , , , , , , , , , , , , , , , , ,			
Leathan (Ruch (Juppurs pariagous)	10	<u> </u>	EACIA	Sapling – Woody plants, excluding woody vines,			
			FACIN	than 3 in (7.6 cm) DBH			
Spotted joe-pye weed (Eutrochium maculatui	<u> </u>		FACW	and is in the only bon.			
_{i,} Groundnut (Apios americana)	15		FACW	Shrub – Woody plants, excluding woody vines,			
δ				approximately 3 to 20 ft (1 to 6 m) in height.			
	20 20			Herb – All herbaceous (non-woody) plants, including			
				herbaceous vines, regardless of size, and woody			
			() ()	plants, except woody vines, less than approximately			
	<i>li</i>		10. 000	ft (1 m) in height.			
				Woody vine - All woody vines, regardless of height.			
1							
	90	= Total Cov	er				
50% of total cover: 45	20% of	total cover:	18				
Noody Vine Stratum (Plot size:							
1.							
2							
)	<u> </u>						
·							
i	-			Hydrophytic			
		= Total Cov	er	Vegetation			
50% of total cover:	20% of	total cover-		Present? Yes 🖌 No			
		total cover.					
cemarks: (include photo numbers here or on a separate s	neet.)						
IS Army Corps of Engineers				Eastern Mountains and Piedmont – Vers			

SOIL							S	ampling Po	pint: DIUVV
Profile Des	cription: (Describe	to the de	pth needed to doc	ument the indicate	r or confiri	n the absence	of indicato	ors.)	
Depth	Matrix		Rec	lox Features					
(inches)	Color (moist)	%	Color (moist)	% Туре	Loc ²	Texture	-	Remarks	
0-1	10YR 3/1	100							
0-12	10YR 5/2	40	10YR 5/6	20		SiL	colors a	re lavered	
		-0	10VP 6/1	30	0		fine ara	, nular eilty t	o sandy loa
						· <u>· · · · · · · · · · · · · · · · · · </u>	nine gra	nulai Silty t	o sandy ioa
	·		10YR 3/1	_ <u>10</u>					
						л. – – – – – – – – – – – – – – – – – – –			
					100	54	5		
		-10							
	n <u></u>		· ·						
			·				-		
	51 				100				
Tumor C. C	Concentration D. Dec	alation DA	Deduced Metrix A	AC Masked Cond (Nealing	² Lagation: D	Dene Lini	ng M Mateire	
Type: C=C	oncentration, D=De	pieuon, Riv	1=Reduced Matrix, r	VIS=Masked Sand (srains.	Location: P	tere for Pr	ng, m=matrix.	udria Saile ³
Llistage			Dorfe Surfa	aa (67)					yunc sons .
	ninodon (A2)			ce (S7) Polow Surfood (S9)	(MI DA 147		Critiviuck (/	Dodox (A16)	147)
Black H	hipeuori (A2)			Surface (SQ) (MLD)	(WERA 147	, 140)		7 148)	
	en Sulfide (A4)			ved Matrix (F2)	(147, 140)		Piedmont Flo	odplain Soils	(F19)
Stratifie	d Lavers (A5)		Depleted N	latrix (F3)			(MLRA 13	6, 147)	(110)
2 cm M	uck (A10) (LRR N)		Redox Darl	k Surface (F6)			ery Shallow	Dark Surface	e (TF12)
Deplete	d Below Dark Surfac	ce (A11)	Depleted D	ark Surface (F7)			ther (Expla	in in Remarks	5)
Thick D	ark Surface (A12)		🔲 Redox Dep	ressions (F8)					
Sandy I	Mucky Mineral (S1) ((LRR N,	Iron-Manga	anese Masses (F12) (LRR N,				
MLR	A 147, 148)		MLRA 1	136)		3.			
Sandy C	Gleyed Matrix (S4)			face (F13) (MLRA	136, 122)	°Inc	licators of h	ydrophytic veg	getation and
Sandy I	Kedox (S5)		Pleamont F Ded Darapt	Motorial (E21) (MI) (WILRA I DA 127 14	48) We	euana nyaro	logy must be	present,
Bestrictive	Laver (if observed)	•	Reu Paren		.KA 127, 14		iless distain	ed of problem	Iduc.
Tupo		•							
Dopth (in	under and the					Undain Cai	Dresent2	Vac V	
Deptri (ir	iches):					Hydric Sol	Present?	res	
Nernarks.	lo Soil Map Unit	Data ava	ailable for this ar	rea					
Army Cor	ps of Engineers					Easten	n Mountains	and Piedmor	nt – Version 2.
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	7'27.28''N Long: 84°18'37.66''W Datum:								
Soil Map Unit Name:	NWI classification:								
Are climatic / hydrologic conditions on the site typical for this tim	ne of year? Yes 🔽 No 🦲 (If no, explain in Remarks.)								
Are Vegetation Soil , or Hydrology signi	ificantly disturbed? Are "Normal Circumstances" present? Yes 🖌 No								
Are Vegetation Soil , or Hydrology natu	rally problematic? (If needed, explain any answers in Remarks.)								
SUMMARY OF FINDINGS – Attach site map she	owing sampling point locations, transects, important features, etc.								
Hydrophytic Vegetation Present? Yes ✓ No Hydric Soil Present? Yes ✓ No	Is the Sampled Area within a Wetland? Yes 🔽 No								
Wetland Hydrology Present? Yes V No	<u></u> ł								
Remarks:	and want of the complex (read								
0.63 acre welland localed horth of the Haul Road	and west of the cemetery road.								
HYDROLOGY									
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)								
Primary Indicators (minimum of one is required; check all that	apply) Surface Soil Cracks (B6)								
Surface Water (A1) ☐ True Aq	uatic Plants (B14) Sparsely Vegetated Concave Surface (B8)								
High Water Table (A2)	en Sulfide Odor (C1)								
Saturation (A3)	d Rhizospheres on Living Roots (C3)								
✓ Water Marks (B1) Present	ce of Reduced Iron (C4) Dry-Season Water Table (C2)								
V Sediment Deposits (B2)	Iron Reduction in Tilled Solis (C6)								
Algel Mat or Crust (B4)	Explain in Demarks)								
Inundation Visible on Aerial Imagery (B7)									
Water-Stained Leaves (B9)	Microtopographic Relief (D4)								
Aquatic Fauna (B13)	FAC-Neutral Test (D5)								
Field Observations:									
Surface Water Present? Yes ✓ No Depth	(inches): 1								
Water Table Present? Yes 🔽 No 🗔 Depth	(inches): 0								
Saturation Present? Yes Vo Depth	(inches); 0 Wetland Hydrology Present? Yes V No								
(includes capillary fringe)									
Describe Recorded Data (stream gauge, monitoring well, aeria	al photos, previous inspections), if available:								
Domarke									
Iron evidizing besteria present									
I on-oxidizing bacteria present									

US Army Corps of Engineers

VEGETATION (Five Strata) – Use scientific na	ames of p	plants.		Sampling Point: D10W-B
	Absolute	Dominant	Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size:)	<u>% Cover</u>	Species?	<u>Status</u>	Number of Dominant Species
1. Sweetgum (Liquidambar styracinda)	40	<u> </u>	FAC	That Are OBL, FACW, or FAC: (A)
2. Red Maple (Acer rubrum)	40	<u> </u>	FAC	Total Number of Dominant
				Species Across All Strata: 8 (B)
4			0	Percent of Dominant Species
5			10 1 0	That Are OBL, FACW, or FAC: <u>100</u> (A/B)
6	20			Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of Multiply by
50% of total cover: 40	20% of	total cover:	16	OBI species x1 =
Sapling Stratum (Plot size:)				FACW species x2 =
1				FAC species x 3 =
2	·			FACU species x 4 =
3				UPL species x 5 =
4		·	· <u> </u>	Column Totals: (A) (B)
5				
6				Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
Shrub Stratum (Plot size:)				2 - Dominance Test is >50%
1. Sweetgum (Liquidambar styraciflua)	20	D	FAC	3 - Prevalence Index is ≤3.0 ¹
2. Green ash (Fraxinus pennsylvanica)	20	D	FACW	4 - Morphological Adaptations ¹ (Provide supporting
3				data in Remarks or on a separate sheet)
4				Problematic Hydrophytic Vegetation' (Explain)
5.				ferrer and an a second as
6				Indicators of hydric soil and wetland hydrology must
	40	= Total Cov	er	Definitions of Five Vegetation Strata:
50% of total cover: 20	20% of	total cover-	8	bennitions of the vegetation of the
Herb Stratum (Diot size:		total cover.		Tree – Woody plants, excluding woody vines,
1 Poison ivv	20	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH).
2 Stiltgrass (Microstegium vimineum)	15	D	FAC	
3 Jewelweed (Impatiens capensis)	15	D	FACW	approximately 20 ft (6 m) or more in height and less
A Fringed sedge (Carex crinita)	15	D	OBL	than 3 in. (7.6 cm) DBH.
5 Tubercled Rein Orchid (Platanthera flava var	10		FACW	Shrub Woody plants excluding woody vines
6 Spotted Lady's Thumb (Persicaria maculosa)	15	D	FACW	approximately 3 to 20 ft (1 to 6 m) in height.
7 Marsh Blue Violet (Viola cucullata)	2		FACW	Harb All berbassaus (non-weady) plants including
8 Sensitive Fern (Onoclea sensibilis)	2		FACW	herbaceous vines, regardless of size, and woody
Soft rush (Juncus effusus)	2		FACW	plants, except woody vines, less than approximately 3
10 Stiff Cowbane (Oxypolis rigidior)	2	3 .	OBL	it (Thi) in neight.
11 Bulbous bittercress (Cardamine bulbosa)	2		OBL	Woody vine – All woody vines, regardless of height.
····	100	- Total Cov	or	
50% (1000) 50			20	
SU% of total cover: 00	20% 01	total cover:		
woody vine Suatum (Piot size:)				
۲ ۲				
2				
٥ ۸		· · · · · · · · · · · · · · · · · · ·		
4				
D		Tatal C		Hydrophytic
	= Total Cover			Present? Yes V No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate s	heet.)	and in the second second		
Includes the largest know population of rein orc	hid on the	e ORR.		
US Army Corps of Engineers				Eastern Mountains and Piedmont – Version 2

Sampling Doint	D10W-B

SOIL								Sa	ampling Po	
Profile Des	cription: (Describe	e to the depth	needed to docu	ment the ir	ndicator	or confirm	the absence	of indicato	rs.)	
Depth	Matrix		Rede	ox Features						
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture		Remarks	
0-10	10YR 5/1	100					SiL	taken at	emergent of	community
6				i 				near Ha	ul Road	
	3 ×									
	1									
								-		
for the second sec	8 A.						5	<i>n</i> -		
<u></u>	e 1					s <u></u>		<u></u>		
8							20	-		
	-1 a-									
1			n (2020) n 20			2	2		202 202 (N)	
Type: C=C	Concentration, D=De	pletion, RM=R	educed Matrix, M	S=Masked	Sand Gra	ains.	*Location: P	L=Pore Linir	ig, M=Matrix.	4.1. 0.11.3
Hydric Soil	Indicators:						Indic	ators for Pro	oblematic Hy	dric Solls":
Histosc	I (A1)		Dark Surface	e (S7)	1000 40			cm Muck (A	10) (MLRA 14	17)
	pipedon (A2)			elow Surfac	ce (S8) (IV	ILRA 147,	148)	Coast Prairie	Redox (A16)	
	IISUC (A3)			urface (S9) ad Motrix (F	(IVILRA 1 	47, 148)		(MLRA 14)	/, 148) adalain Saila /	F10)
Stratifie	el Javers (A5)		Depleted Ma	eu Maura (r atrix (E3)	2)			(MIRA 13)	3 147)	1 13)
$\square 2 \text{ cm M}$	uck (A10) (LRR N)		Redox Dark	Surface (F	6)			erv Shallow	Dark Surface	(TE12)
Deplete	d Below Dark Surface	ce (A11)	Depleted Da	rk Surface	(F7)		T	ther (Explain	n in Remarks)	(11-12)
Thick D	Oark Surface (A12)		Redox Depr	essions (F8	3)				,	
Sandy I	Mucky Mineral (S1) ((LRR N,	Iron-Mangar	iese Masse	es (F12) (LRR N,				
MLR	A 147, 148)		MLRA 13	86)						
Sandy	Gleyed Matrix (S4)		Umbric Surf.	ace (F13) (MLRA 13	6, 122)	³ Inc	licators of hy	drophytic veg	etation and
🔲 Sandy	Redox (S5)		Piedmont FI	oodplain Sc	oils (F19)	(MLRA 14	8) we	etland hydrol	ogy must be p	resent,
Strippe	d Matrix (S6)		Red Parent	Material (F2	21) (MLR	A 127, 147	/) un	less disturbe	d or problema	itic.
Restrictive	Layer (if observed)):								
Туре:										
Depth (ir	nches):		_				Hydric Soil	Present?	Yes 🗸	No 🛄
Remarks:		Deter sourile	le l'est Rece Ale Services							
P	to Soli Map Unit	Data avalla	DIE IOT UNIS ATE	ea						

Project/Site: UPF W11	City/County: ORNL/Y12 Sampling Date: 7/2717
Applicant/Owner: UPF Haul Road Wetland Mitigation	State: TNSampling 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°57'1	9.11''N Long: <u>84°18'33.66</u> ''W Datum:
Soil Map Unit Name: (not mapped)	NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of	of year? Yes 🖌 No 🦲 (If no, explain in Remarks.)
Are Vegetation Soil , or Hydrology significa	ntly 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 show	ing sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes Vo	Is the Sampled Area
Hydric Soil Present? Yes V No	
Pemarke:	_ł
Datasheet represent summary of wetland, including photos are shown in section 3.5.	nydrology, dominant plants, and soil characteristics. Wetland 11
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that app	oly) Surface Soil Cracks (B6)
Surface Water (A1)	ic Plants (B14)
High Water Table (A2)	Sulfide Odor (C1) Drainage Patterns (B10)
Saturation (A3)	hizospheres on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1) Presence of P	Reduced Iron (C4) Dry-Season Water Table (C2) Deduction in Tilled Sails (C2)
Drift Deposits (B3)	Surface (C7)
Algal Mat or Crust (B4)	lain in Remarks)
I Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes 🖌 No 💭 Depth (inc	hes): <u>31</u>
Water Table Present? Yes No Depth (inc	hes):
Saturation Present? Yes No Depth (inc	hes): Wetland Hydrology Present? Yes ✓ No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial p	hotos, previous inspections), if available:
Remarks:	
10% open water	
Humped bladderwort is the true aquatic plant	
Lancono rentan contractorente parateira la contar parateira nel referente intervente	

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EGETATION (Five Strata) – Use scientific n	ames of	plants.		Sampling Point: W11
Tree Stratum (Distaire)	Absolute	Dominant	Indicator	Dominance Test worksheet:
)	% Cover	Species?	Status	Number of Dominant Species That Are OBL, FACW, or FAC: _2(A)
۶ <u>ــــــــــــــــــــــــــــــــــــ</u>				Total Number of Dominant Species Across All Strata: 2 (B)
- 	-	·		Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100 (A/B)
		= Total Cove	er	Prevalence Index worksheet: Total % Cover of:Multiply by:
50% of total cover:	20% of	total cover:		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 =
		= Total Cove	er	Hydrophytic Vegetation Indicators:
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
hrub Stratum (Plot size:)				2 - Dominance Test is >50%
· · · · · · · · · · · · · · · · · · ·		,		3 - Prevalence Index is ≤3.0
		· <u>······</u> ·	<u></u>	4 - Morphological Adaptations ¹ (Provide supporting
		;		Problematic Hydrophytic Vegetation ¹ (Explain)
۱	·			
				Indicators of budge soil and wetland budgeleau must
i				be present, unless disturbed or problematic.
	· <u></u>	= Total Cove	er	Definitions of Five Vegetation Strata:
50% of total cover:	20% of	total cover:	;	Tree – Woody plants, excluding woody vines.
lerb Stratum (Plot size:)				approximately 20 ft (6 m) or more in height and 3 in.
cattail (Typha sp.)	35	+	OBL	(7.6 cm) or larger in diameter at breast height (DBH).
Softstem bulrush	35	+	OBL	Sapling - Woody plants, excluding woody vines,
(Schoenoplectus tabernaemontani)				approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
Other (see remarks)	20	· <u>·····</u> ›		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 If (1 m) in height
0				Weedwaine All weedwaines regardless of height
1		;;		woody vine – All woody vines, regardless of neight.
	90	= Total Cove	er.	
50% of total cover:	20% of	total cover:		
Woody Vine Stratum (Plot size:)				
n non het de gebruike annee die eerste meerste se bekende en de seelen eerste se bekende eerste se bekende eers 12				
) 				
B				
	-			History balls
		= Total Cove	er	Vegetation
50% of total cover:	20% of	total cover:		Present? Yes V No
emarks: (Include photo numbers here or on a separate s	sheet.)			
SEE "Vegetation Remarks" on next page				

SOIL								S	ampling Po	Int: VVII
Profile Des	cription: (Describe	to the de	oth needed to docur	nent the	indicator	or confirm	the absence	of indicato	ors.)	
Depth	Matrix		Redo	<u>x Feature</u>	es					
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	<u>.</u>	Remarks	
0-4	2.5Y 5/2	70	7.5YR 6/8	30	С	М		SiLo		
4-6	2.5Y 6/2	60	10YR 6/8	40	С	М		SiC		
6+	5 				a 2			rock/ara	ivel	
	5 x							Toologic		
	i i							÷		
	-									
·	5 .							0		
								÷		
	s ,									
	e #									
¹ Type: C=C	oncentration, D=Dep	oletion, RM	I=Reduced Matrix, MS	S=Maske	d Sand Gr	ains.	² Location: P	L=Pore Lini	ng, M=Matrix.	
Hydric Soil	Indicators:		_				Indic	ators for Pr	oblematic Hy	dric Soils ³ :
Histoso	(A1)		Dark Surface	e (S7)			2	cm Muck (/	410) (MLRA 1 4	47)
Histic E	pipedon (A2)		Polyvalue Be	low Surfa	ace (S8) (I	VLRA 147,	148) 🔲 🤇	Coast Prairie	Redox (A16)	
Black H	istic (A3)		Thin Dark Su	Inface (SS) (MLRA	147, 148)	Ξ.	(MLRA 14	7, 148)	
Hydroge	en Sulfide (A4)		Loamy Gleye	ed Matrix	(F2)			Piedmont Flo	odplain Soils i	(F19)
	u Layers (AS)		Redox Dark	uix (F3) Surface (F6)			(IVILRA IS erv Shallow	0, 147) / Dark Surface	(TE12)
Deplete	d Below Dark Surfac	e (A11)	Depleted Dal	rk Surface	e (F7)		Пċ	ther (Expla	in in Remarks)	(11 12)
Thick D	ark Surface (A12)	New Address (1990)	🔲 Redox Depre	essions (F	-8)			A COLOR DOWN		
🔲 Sandy M	Aucky Mineral (S1) (LRR N,	🔲 Iron-Mangan	ese Mass	ses (F12)	(LRR N,				
MLR.	A 147, 148)		MLRA 13	6)			2			
Sandy C	Gleyed Matrix (S4)		Umbric Surfa	ice (F13)	(MLRA 13	36, 122)	°Inc	licators of h	ydrophytic veg	etation and
Sandy H	Redox (S5)		Piedmont Flo	odplain S	Soils (F19)	(MLRA 14	8) We	etland hydro	logy must be p ad ar problem.	oresent,
Postrictive	I want (30)	•	Reu Pareni r	viateriai (i		(A 127, 147	un I	iless uistui D	ed of problema	auc.
Typo: IC	ck/gravel	•								
Dopth (in	choc): 6						Undria Sail	Drocont2	Voc V	
Deput (iii	unes). <u>•</u>						Hyune Son	Present?		
Remarks:										
S	OIL REMARKS									
A	II samples inund	ated. 2.5	5Y 5/2 (with conce	entratio	n) or 2.5	Y 6/2 wa	s common	within the	first 6inche	s. Gleyed
S	oil was found in f	two of th	e plot soil sample	s. Rock	k barrier	varies fro	om 6 inches	s to 12+ ir	iches.	
-		· · · · · · · · · · · · · · · · · · ·					lanana Miradiana			
S	oils within the m	itigation	sites are a result	of wetla	and and	or organ	ic soils dep	osited in 2	2014	
V	EGETATION RE	MARKS								
v										
s	pecies on the we	etland fri	naes included bu	t not lin	nited to r	ice cutar	ass. sallow	sedae. w	ool arass, s	oft rush. iris.
a	rowhead, picker	elweed,	seedbox, marsh	seedbo	x, jewel	weed, ag	rimony, mo	nkey flow	er, groundn	ut. Humped
b	adderwort - unc	ommon ['] t	o east Tennesse	e - was	s once a	gain four	nd in the no	rthern por	nded area. S	Southern
b	ueflag iris was fo	ound for	the first time alor	ng the s	ourtherr	wetland	edge for th	e first tim	e.	
	640						19727			

Project/Site: EMDF NT11-A City	County: Roane Sampling Date: 5/11/18
Application of the second seco	tion Tewnshin Danger
Landform (billclope torrace etc.): Terrace	
Eutropic (IIIIsiope, terrace, etc.). <u>Fondoo</u>	Long 84°18'49 48'W
Sublegion (ERR of MERA) Eat Eat.	Long. Of to to to to Datum.
Soli Map Onic Name.	Vac / Na //fina aurilain in Demories)
Are climatic / hydrologic conditions on the site typical for this time of year?	
Are vegetation Soll, or Hydrology significantly dist	
Are Vegetation, Soil, or Hydrology naturally problem	natic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sa	mpling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes ✓ No Hydric Soil Present? Yes ✓ No Wetland Hydrology Present? Yes ✓ No Remarks:	Is the Sampled Area within a Wetland? Yes <u>Ves</u> No <u></u>
0.77 acre wetland	
located north of the Haul Road on the western edge of bou	ndarv
	1467210
HADBOLOCA	
Watland Hydrology Indicators	Secondary Indicators (minimum of two required)
Drimery Indicators (minimum of one is required, sheek all that apply)	
Primary indicators (minimum or one is required; check all that appry)	(B14)
Image: Value of the second	(G1) Sparsery Vegetated Concave Surface (B8)
✓ High Water Table (A2) ✓ Hydrogen Sullide C	ares on Living Poots (C3) Moss Trim Lines (B16)
V Saturation (AS)	ad Iran (C4)
Vale Marks (B1) Presence of Reduct	ion in Tilled Soils (C6)
Drift Doposits (D2)	(C7) Saturation Visible on Aerial Imageny (C9)
Algal Mat or Crust (B4)	amarks)
	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Acuitard (D3)
Water-Stained Leaves (B9)	
Aquatic Fauna (B13)	EAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Ves V No Depth (inches): 3	
Water Table Present? Ves Val No Depth (inches): 0	
Seturation Descent? Yes Via Depth (inches).	
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, p	revious inspections), if available:
Remarks:	
seasonally high groundwater table, periodic overbanking of	the tributary, and multiple wet weather conveyances that
drain into the ravine	man management of a source control into a the control of a source
variable surface water depending on proximity to tributary a	ind seeps

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/EGETATION (Five Strata) – Use scientific na	ames of	plants.		Sampling Point: <u>NI11-A</u>
	Absolute	Dominant	Indicator	Dominance Test worksheet:
<u>Plot size:</u>) Sweetaum (Liquidambar styraciflua)	30	Species?		Number of Dominant Species
	30		EAC	That Are OBL, FACW, or FAC: $\underline{0}$ (A)
		<u> </u>		Total Number of Dominant
	-	-		Species Across All Strata: <u>6</u> (B)
n			o <u> </u>	Percent of Dominant Species
i	6			That Are OBL, FACW, or FAC: 100% (A/B
i		-		Prevalence Index worksheet:
	60	= Total Cov	er	Tatal % Caver of Multiply by
50% of total cover: 30	20% of	total cover:	12	
Sapling Stratum (Plot size:)				
				FACW species X Z =
	2			FAC species X 3 =
				FACU species x 4 =
			30	UPL species x 5 =
		-		Column Totals: (A) (B)
				Dravelance IndexP/A
	2 2	Tabel Co		Prevalence index = b/A =
		= Total Cov	er	
50% of total cover:	20% of	total cover:		1 - Rapid Test for Hydrophytic Vegetation
Shrub Stratum (Plot size:)				2 - Dominance Test is >50%
1. Sweetgum (Liquidambar styraciflua)	20	D	FAC	3 - Prevalence Index is ≤3.0
2. Green Ash	20	D	FACW	4 - Morphological Adaptations ¹ (Provide supportin
3. Flowering Dogwood	3		FACU	data in Remarks or on a separate sheet)
4.	20 16			Problematic Hydrophytic Vegetation' (Explain)
	2			
5				¹ Indicators of hydric soil and wetland hydrology must
	43	- Total Cov	er.	be present, unless disturbed of problematic.
50% of total cover: 21.5	20% of	total cover:	8.6	
Herb Stratum (Plot size:)				I ree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in
Poison ivy	20	D	FAC	(7.6 cm) or larger in diameter at breast height (DBH).
Stiltgrass (Microstegium vimineum)	15	D	FAC	
Jewelweed (Impatiens capensis)	10	-	FACW	approximately 20 ft (6 m) or more in height and less
Fringed sedge (Carex crinita)	15	D	OBI	than 3 in. (7.6 cm) DBH.
Tubercled Rein Orchid (Platanthera flava var	10		FACW	Charles Mandemants and sting use devices
Spotted Lady's Thumb (Persicaria maculosa)	5	×	EACIA	approximately 3 to 20 ft (1 to 6 m) in height.
	2	-	EACIN	
	~		FACIV	Herb – All herbaceous (non-woody) plants, including
	2		FACIV	plants, except woody vines, less than approximately 3
	2		FACW	ft (1 m) in height.
0. Groundnut (Apios americana)	5		FACW	Woody vine All woody vines regardless of height
1. Frank's Sedge (Carex frankii)	15	<u>D</u>	OBL	woody vine – All woody vines, regardless of height.
	101	= Total Cov	er	
50% of total cover: 50.5	20% of	total cover	20.2	
Noody Vine Stratum (Plot size:				
(((((((((((((((((((
)		· · · · · · · · · · · · · · · · · · ·		
4				
ō	-	-		Hydrophytic
		= Total Cov	er	Vegetation
50% of total cover:	20% of	total cover:		Present? Yes Yes No
Remarks: (Include photo numbers here or on a separate s	heet.)			1
S Army Corps of Engineers				Eastern Mountains and Piedmont – Version 2.

Matrix Redox Features (inches) Color (moist) % Color (moist) % Type ¹ Loc ² Texture	of indicators.)
Depth Matrix Redox Features (inches) Color (moist) % Color (moist) % Type ¹ Loc ² Texture 0.6 10VP 5/4 80 10VP 5/6 20 C M SiCl	
<u>(inches)</u> <u>Color (moist)</u> <u>%</u> <u>Color (moist)</u> <u>%</u> <u>Type</u> ³ <u>Loc</u> ² <u>Texture</u>	
	Remarks
· · · · · · · · · · · · · · · · · · ·	
· · · · · ·	
	<u></u>
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. "Location: P	L=Pore Lining, M=Matrix.
	ators for Problematic Hydric Solls :
Listic Episoden (A1) Dark Surface (S7) 2 2	CM MUCK (ATU) (WILRA 147)
Histic Epipedon (A2) Polyvalue Below Surface (S8) (MILRA 147, 148) D	(Mal DA 147 149)
Hydrogen Sulfide (A4)	(IVIERA 147, 146) Piedmont Eloodolain Soils (E19)
Stratified Lavers (A5)	(MI RA 136, 147)
2 cm Muck (A10) (LRR N)	ery Shallow Dark Surface (TF12)
Depleted Below Dark Surface (A11)	Other (Explain in Remarks)
Thick Dark Surface (A12)	
Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N,	
MLRA 147, 148) MLRA 136)	
Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Inc	licators of hydrophytic vegetation and
Sandy Redox (S5)	tland hydrology must be present,
Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) un	less disturbed or problematic.
Restrictive Layer (if observed):	
Туре:	
Depth (inches): Hydric Soil	Present? Yes 🔽 No 🗔
Domarka:	10 M 10 M
remarks. Inundated areas near the road had some dayed soil	
Inundated areas near the road had some glayed soil	
No Soil Map Unit Data available for this area	
No Soil Map Unit Data available for this area	
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Inundated areas near the road had some glayed soil No Soil Map Unit Data available for this area	
Inundated areas near the road had some glayed soil No Soil Map Unit Data available for this area	
Inundated areas near the road had some glayed soil No Soil Map Unit Data available for this area	

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 (hillstope, terrace, etc.): Terrace Local relief (concave, convex, none): level/concave Stope (%):
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 V No (If no. explain in Remarks.)
Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes V 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 V No
Hydric Soil Present? Yes V No within a Wetland? Yes V No
Wetland Hydrology Present? Yes V No
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
Wetland Hydrology Indicators: Secondary Indicators (minimum of two required)
Drimary Indicators (minimum of one is required: check all that apply)
Surface Writer Concerns (Malliant of Others Heydered, offection and real capping) Guided Concerns (Concerns Concerns Con
Sunde water (A1) The Aquater France (514) Springer Statters (210)
✓ Sturation (A3)
water indiase (cr) Firstelle of reduction in Tilled Sole (Cr) Courter Partice of Reduction in Tilled Sole (Cr) Courter Partice Of Reduction in Tilled Sole (Cr)
□ Detil Paperite Deposits (62) □ Reterit inor Reduction in miled solis (60) ▼ Crajnish Duriws (60)
Diffic Depuists (G3)
Inter Deposits (53) Schlow Agrical Imagery (P1) Schlow Agrical (C2)
Indiraduoti visible on Aeria magery (57) Standow Aquicat (53) Microstonegraphic Boliof (54)
Anutic Fauna (B13) Zet C.Neutral Test (D5)
Field Observations:
Surface Water Dresent? Vas No 🗸 Denth (inches)
Saturation Present? Tes V No Depth (incluse):
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
emarks:
The wetland follows the tributary becoming narrower and wider based on the surrounding topography.

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VEGETATION (Five Strata) – Use scientific na	ames of j	plants.		Sampling Point: NT11-B
4-11 050 100000 #* 07	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	<u>% Cover</u> 10	Species?	<u>Status</u> OBI	Number of Dominant Species That Are OPI EACM or EAC: 5 (A)
2 Sweetgum (Liguidambar styraciflua)	15	D	FAC	
3.				Total Number of Dominant Species Across All Strate: 5 (B)
4.				
5				Percent of Dominant Species
6.	<i>.</i>			
	25	= Total Cove	er	Prevalence Index worksheet:
50% of total cover: 12.5	20% of	total cover-	5	Total % Cover of: Multiply by:
Sapling Stratum (Plot size:		total cover.		OBL species x 1 =
1				FACW species x 2 =
2		<u> </u>		FAC species x 3 =
3				FACU species x 4 =
4	æ			UPL species x 5 =
	×	-		Column Totals: (A) (B)
6.				Prevalence Index = B/A =
2		= Total Cove	er	Hydrophytic Vegetation Indicators:
50% of total cover	20% of	total cover-		1 - Rapid Test for Hydrophytic Vegetation
Shruh Stratum (Plot size:	2070.01	total cover.		2 - Dominance Test is >50%
1 Spicebush (Lindera benzoin)	20	D	FAC	3 - Prevalence Index is $\leq 3.0^1$
2.				4 - Morphological Adaptations ¹ (Provide supporting
3				data in Remarks or on a separate sheet)
4				
5				Indiators of buddie coll and wattend buddets or must
6				be present, unless disturbed or problematic.
	20	= Total Cove	er	Definitions of Five Vegetation Strata:
50% of total cover: <u>10</u>	20% of	total cover:	4	Tree Weedu plants evoluting weedu vines
Herb Stratum (Plot size:)				approximately 20 ft (6 m) or more in height and 3 in.
 Jewelweed (Impatiens capensis) 	30	<u>D</u>	FACW	(7.6 cm) or larger in diameter at breast height (DBH).
2. Spotted Lady's-Thumb (Persicaria maculosa	20	D	FACW	Sapling – Woody plants, excluding woody vines.
3. Agrimony (Agrimonia parviflora)	20	D	FACW	approximately 20 ft (6 m) or more in height and less
4. Poison Ivy (Toxicodendron radicans)	15		FAC	than 3 in. (7.6 cm) DBH.
5. Periwinkle (Vinca minor)	5		<u> </u>	Shrub – Woody plants, excluding woody vines,
_{6.} Soft rush (Juncus effusus)	5		FACW	approximately 3 to 20 ft (1 to 6 m) in height.
7. Spotted joe-pye weed (Eutrochium maculatur	2		FACW	Herb – All herbaceous (non-woody) plants, including
_{8.} Rose sp.	5			herbaceous vines, regardless of size, and woody
9				ft (1 m) in height.
10				Woody vine All woody vines regardless of height
11				woody vine - Air woody vines, regardless of height.
	102	= Total Cove	er	
50% of total cover: <u>51</u>	20% of	total cover:	20.4	
Woody Vine Stratum (Plot size:)				
1				
2				
3				
4				
5				Hydrophytic
		= Total Cove	er	Vegetation
50% of total cover:	20% of	total cover:		Present? Yes Ves No
Remarks: (Include photo numbers here or on a separate s	heet.)			
most woody species outside of wetland				

SOIL							Sampling Point: NT11-B
Profile Des	cription: (Describe	to the de	oth needed to docu	ment the indicator or	confirm t	the absence	of indicators.)
Depth (inchas)	Matrix	0/	Red	ox Features	Loo ²	Tosturo	Damarka
<u>(incries)</u> 0-4	10YR 3/2	98	10YR 5/1	2		Texture	Remarks
4-6	10YR 3/2	50	10YR 5/2	30			÷
			10YR 5/1	20			
6.10			10110 5/6	10			avidized reate
0-10		90	101 R 5/6	<u> </u>			Oxidized roots
	d se						
				· · ·			
<u></u>	a e			· · · · · · · · · · · · · · · · · · ·			
<u>.</u>	8 8		5				
	al a r						
	-1 			· <u> </u>			
¹ Type: C=C	Concentration, D=Dep	oletion, RM	I=Reduced Matrix, M	IS=Masked Sand Graii	ns.	² Location: P	L=Pore Lining, M=Matrix.
Hydric Soil	Indicators:		_			Indica	ators for Problematic Hydric Soils ³ :
Histoso	l (A1)		Dark Surfac	e (S7)	DA 447 4		cm Muck (A10) (MLRA 147)
Black E	listic (A3)		Thin Dark S	elow Surface (S8) (IVIL urface (S9) (MI RA 14	.RA 147, 1 7. 148)	48)	(MIRA 147, 148)
Hydrog	en Sulfide (A4)		Loamy Gley	ed Matrix (F2)	.,,	🔲 Р	iedmont Floodplain Soils (F19)
Stratifie	d Layers (A5)		Depleted Ma	atrix (F3)			(MLRA 136, 147)
2 cm M	uck (A10) (LRR N)	o (A 11)	Redox Dark	Surface (F6)			ery Shallow Dark Surface (TF12)
	ark Surface (A12)	e (ATT)	Redox Depr	essions (F8)			
Sandy	Mucky Mineral (S1) (LRR N,	Iron-Mangar	nese Masses (F12) (Ll	RR N,		
	A 147, 148)		MLRA 13	36) (F12) (MU DA 120	1001	31	in stand of building building and stings and
Sandy Sandy	Redox (S5)		Piedmont Fl	oodplain Soils (F19) (, 122) VI.RA 148) we	tland hydrology must be present.
Strippe	d Matrix (S6)		Red Parent	Material (F21) (MLRA	127, 147)	un	less disturbed or problematic.
Restrictive	Layer (if observed)	:					
Type: Denth (ir	nches).					Hydric Soil	Present? Yes 🗸 No
Remarks	ienes).					injune con	
S	oil sample taken	near RS	lweir				
N	lo Soll Map Unit	Data ava	allable for this are	ea			

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 signific	cantly disturbed? Are "Normal Circumstances" present? Yes 🖌 No
Are Vegetation Soil , or Hydrology natural	Ily problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map show	wing sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes 🗸 No	
Hydric Soil Present? Yes V	within a Wetland? Yes Vo
Wetland Hydrology Present? Yes 🔽 No 🗍	₹
Remarks:	
1.06 acre wetland	
located just north of Bear Creek Road on the weste	rn 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	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that an	pply) Surface Soil Cracks (B6)
Surface Water (A1)	atic Plants (B14)
High Water Table (A2)	Sulfide Odor (C1) If Drainage Patterns (B10)
Saturation (A3)	Rhizospheres on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1)	of Reduced Iron (C4) Dry-Season Water Table (C2)
✓ Sediment Deposits (B2) Recent In Recent In Recent In Thin Much	Craylish Burrows (C8)
Algal Mat or Crust (B4)	nlain in Remarks)
I Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aguitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes 🗹 No 🛄 Depth (in	nches): 1
Water Table Present? Yes ✓ No ─ Depth (in	nches): 0
Saturation Present? Yes 🖌 No 💭 Depth (in	nches): 0 Wetland Hydrology Present? Yes 🖌 No
(includes capillary fringe) Describe Recorded Data (stream dauge, monitoring well, aerial	nhotos, previous inspections), if available:
Describe recorded Data (silearn gauge, monitoring weil, achai	
Remarks:	
wet hydrology from close proximately to Bear Creek	cand a major tributary
drainage from Bear Creek Road and the surroundin	a forest
Topologic restances for the production tender topological and the second s	

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	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species
1. Red Maple (Acer rubrum)	30	D	FAC	That Are OBL, FACW, or FAC
2. Sweetgum (Liquidambar styraciflua)	25	D	FAC	T.IN. L. ID.
3. Sycamore (Platanus occidentalis)	20		FACW	Species Across All Strata:
4. Tuliptree (Liriodendron tulipifera)	10		FACU	

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

5.

6.

1. 2. 3 4 5.

3. Jack-in-the-Pulpit (Arisaema triphyllum)

5. Cherokee sedge (Carex cherokeensis)

7. Poison Ivy (Toxicodendron radicans)

8. Sharp-scale sedge (Carex oxylepis)

9. Agrimony (Agrimonia parviflora)

10. Groundnut (Apios americana)

11. Fringed Sedge (Carex crinita)

Woody Vine Stratum (Plot size: _____

6. Soft rush (Juncus effusus)

4. Virginia chain ern (Woodw ardia virginica)

85 Total Covor

5			Prevalence Index worksheet:
			Percent of Dominant Species That Are OBL, FACW, or FAC:
)		FACU	
)	-	FACW	Species Across All Strata:
5	D	FAC	Total Number of Deminant
)	D	FAC	That Are OBL, FACW, or FAC:

50% of total cover: 42.5 Sapling Stratum (Plot size:) 1	20% o	f total cover	<u>: 17</u>	Total % Cover of: Multiply by: OBL species x 1 =	(B)
5650% of total cover:	20% 0	= Total Cov	/er	Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation	
Shrub Stratum (Plot size:) Spicebush (Lindera benzoin) Silky dogwood (Cornus amomum) A Ider (Alnus serrulata) Ironwood (Carpinus caoliniana)	40 5 5 10		FAC FACW OBL FAC	✓ 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.01 4 - Morphological Adaptations1 (Provide suppor data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation1 (Explain)	rting
5. Multiflora rose (Rosa multiflora) 6	3		FACU	¹ Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.	st
50% of total cover: <u>31.5</u> <u>Herb Stratum</u> (Plot size:) 1. Jewelweed (Impatiens capensis) 2. Stilt Grass (Microstegium vimineum)	<u>20% o</u> 20% o 20 10	f total cover	<u>12.6</u> <u>FACW</u>	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	I).

2

2

5

2

2

98

50% of total cover: 49

50% of total cover:

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

1

woody vines, e in height and 3 in. breast height (DBH). 10 FAC Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less FACW OBL than 3 in. (7.6 cm) DBH. 10 FACW Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height. 15 D FACW 15 D FAC Herb – All herbaceous (non-woody) plants, including 15 D FACW

Hydrophytic

Vegetation Present?

FACW

FACW

OBL

= Total Cover ___ 20% of total cover: 19.6

= Total Cover

20% of total cover:

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

herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Sampling Point: NT11-C

7

7

100

(A)

(A/B)

_____ (B)

Woody vine - All woody vines, regardless of height.

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1 Yes

No

SOIL

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Comp	lina	Doint		, 연, 14)	1-6
241111		ET UU U			

SOIL								S	ampling Po	int: <u>NTTT-C</u>
Profile Des	cription: (Describe	to the depth n	eeded to docu	ment the in	dicator o	or confirm	n the absence	of indicate	ors.)	
Depth	Matrix		Redo	ox Features						
(inches)	Color (moist)	(Color (moist)	%	Type ¹	Loc ²	Texture	<u>.</u>	Remarks	
0-8	10YR 5/1	100					SiL			
	6 .									
,	c .			· · ·		·				
2	0 			. <u></u> .						
							· · · · · · · · · · · · · · · · · · ·			
£7	a - 1	······						2		
	<u></u>									
		N.M. 10 22				-		~		
								÷		
	SI - 5									
	a 						<u></u>			
¹ Type: C=C	Concentration, D=Dep	oletion, RM=Red	luced Matrix, M	S=Masked S	Sand Gra	ains.	² Location: PL	_=Pore Lini	ng, M=Matrix.	
Hydric Soil	Indicators:						Indica	itors for Pi	oblematic Hy	dric Soils ³ :
Histoso	l (A1)	<u> </u>	Dark Surface	e (S7)			2	cm Muck (/	A10) (MLRA 14	47)
Histic E	pipedon (A2)	Ī	Polyvalue Be	elow Surface	e (S8) (M	ILRA 147,	148) 🗖 Co	oast Prairie	Redox (A16)	
Black H	listic (A3)	E	Thin Dark Si	urface (S9)	(MLRA 1	47, 148)		(MLRA 14	7, 148)	
Hydrog	en Sulfide (A4)	Ľ	Loamy Gley	ed Matrix (F	2)		🗖 Pi	edmont Flo	odplain Soils (F19)
Stratifie	d Layers (A5)		Depleted Ma	atrix (F3)				(MLRA 13	6, 147)	
2 cm M	uck (A10) (LRR N)		Redox Dark	Surface (F6	5)			ery Shallov	Dark Surface	(TF12)
Deplete	d Below Dark Surfac	e (A11)	Depleted Da	rk Surface ((F7)			ther (Expla	in in Remarks)	
	ark Surface (A12)		Redox Depr	essions (F8)) - (E10) (I					
	VIUCKY MINERAL (ST) (LRR N,	I Iron-Iviangar	iese Masses	s (F 12) (I	LRR N,				
	A 147, 140) Cloved Matrix (S4)	Ē		00) 000 (E12) (N	ALDA 12	6 122)	³ lndi	cotors of b	udrophytic yog	otation and
Sandy I	Sedox (S5)	Ē	Diedmont Fl	ace (113) (N ace (113) (N		(MIDA 1/	19) wei	tland hydro	loav must be n	recent
	d Matrix (S6)	Ť	Red Parent	Material (F2	1) (MI R	A 127 14	7) unl	ess disturb	ed or problema	atic
Restrictive	Laver (if observed)	:	i tour arone					o o o u o turb	ou or problom	
Type:										
Denth (ir	iches):						Hydric Soil	Present?	Yes 🗸	
Pomarks:										
Normania.	lo Soil Map Unit I	Data availab	le for this are	ea						
C	oncentrations are	e not require	d in soils with	n matrix v	alues o	of 5 or m	ore and chro	oma of 1		

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Project/Site: EMDF BCK-A	City/County: Roane Sampling Date: 5/29/18
Applicant/Owner: EMDF	
Investigator(s) Jamie Herold	Section, Townshin, Range:
Landform (hillslope, terrace, etc.) Terrace	ocal relief (concave, convex, none): level/concave Slope (%):
Subregion (LRR or MLRA):	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	vear? Yes V No (If no evolain in Remarks)
Are Vegetation Soil or Hydrology significant	tly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation Soil or Hydrology paturally r	aroblematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showin	ng sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes 🗸 No	
Hydric Soil Present? Yes 🖌 No	within a Wetland? Yes V
Wetland Hydrology Present? Yes 🗸 No	
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	v) Surface Soil Cracks (B6)
Surface Water (A1)	Plants (B14)
High Water Table (A2)	Ifide Odor (C1)
Saturation (A3)	zospheres on Living Roots (C3) Moss Trim Lines (B16)
✓ Water Marks (B1) Presence of	Reduced Iron (C4) Dry-Season Water Table (C2)
Sediment Deposits (B2)	Reduction in Tilled Soils (C6) Crayfish Burrows (C8)
Thin Muck Si	urface (C7) Saturation Visible on Aerial Imagery (C9)
V Algal Mat of Crust (B4)	In In Remarks)
I Inon Deposits (B5)	Geomorphic Position (D2)
Mater Stained Leaves (B9)	Microtopographic Polief (D4)
Aquatic Fauna (B13)	EAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Ves Ves Depth (inche	as). 10
Water Table Present? Vec V	ac): 0
Soturation Drocont? Yos Voc V No Dopth (inche	
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial pho	otos, previous inspections), if available:
Remarks:	
begins where D10W empties into Bear Creek	
multiple beaver dams located along Bear Creek that h	ave created the flooded wetland conditions
2	

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			77. 1111	· · · ·
Tree Stratum (Plot size:	Absolute % Cover	Dominant Species?	Indicator	Dominance Test worksheet:
1 Svcamore (Platanus occidentalis)	<u>% Cover</u>	_species?	FACW	Number of Dominant Species
American Elm (Llimus Americana) EACIA		<u> </u>	FACIN	That Are OBL, FACW, of FAC: $\underline{\bigcirc}$ (A)
2. American Lim (Olmus Americana) 1 AOVV			EACIA	Total Number of Dominant
3. Green Ash (Fraxinus perinsylvanica)		<u> </u>	FACV	Species Across All Strata: <u>5</u> (B)
4. Pinus sp. (dying)	0			Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100 (A/B
6	-			
	26	= Total Cov	er	Prevalence Index worksheet:
50% of total cover: 13	20% of	total cover-	3.2	Total % Cover of: Multiply by:
Sabling Stratum (Diot size:		cotal oo oo.		OBL species x 1 =
				FACW species x 2 =
1,				FAC species x 3 =
Z				FACU species x 4 =
3				UPL species x 5 =
4			<u> </u>	Column Totals: (A) (B)
5				
6		-		Prevalence Index = B/A =
		= Total Cov	er	Hydrophytic Vegetation Indicators:
E00/ oftatal access	200/ -5	total anur-	1. (C)	✓ 1 - Rapid Test for Hydrophytic Vegetation
50% of total cover:	20% OI	total cover:		2 - Dominance Test is >50%
Shrub Stratum (Plot size:)	10	D	OPI	$\square 2 = Dominance results > 50\%$
1. Aluer (Alnus serrulata)	- 10			
2. Spicebush (Lindera benzoin)	10	<u> </u>	FAC	4 - Morphological Adaptations' (Provide supportin
3			. <u> </u>	Droblematic Hydrophytic Vegetation ¹ (Evoloin)
4	_ <u>~</u>			
5				te se an an a c a an a a
6.				Indicators of hydric soil and wetland hydrology must
	20	= Total Cov	er	Definitions of Fire Venetation Chester
10			1	Definitions of Five vegetation Strata:
50% of total cover: 10	20% of	total cover:	7	Tree – Woody plants, excluding woody vines,
Herb Stratum (Plot size:)	05	-		approximately 20 ft (6 m) or more in height and 3 in.
1. Jeweiweed (Impatiens capensis)	20	<u> </u>	FACV	(7.6 cm) of larger in diameter at breast height (DBH).
2. Stilt Grass (Microstegium vimineum)	10		FAC	Sapling – Woody plants, excluding woody vines,
3. Poison Ivy (Toxicodendron radicans)	5		FAC	approximately 20 ft (6 m) or more in height and less
4. Frank's Sedge (Carex frankii)	10		OBL	than 3 m. (7.6 cm) DBH.
5				Shrub – Woody plants, excluding woody vines,
6.				approximately 3 to 20 ft (1 to 6 m) in height.
7.				Herb – All berbaceous (non-woody) plants including
8	1			herbaceous vines, regardless of size, and woody
0			(<u> </u>	plants, except woody vines, less than approximately 3
10			i e con tre	π (1 m) in neight.
	· ·			Woody vine – All woody vines, regardless of height.
11	- <u>-</u>		. <u> </u>	
	50	= Total Cov	er	
50% of total cover: 25	20% of	total cover:	10	
Woody Vine Stratum (Plot size:)				
1.				
2.				
3	0		2 2.	
4			·	
4			2 	
5			<u> </u>	Hydrophytic
		= Total Cov	er	Vegetation
50% of total cover:	20% of	total cover:		Present? Yes V No
				1
Remarks: (Include photo numbers here or on a separate	sheet)			
Remarks: (Include photo numbers here or on a separate	sheet.)	04 800 5	atos an r	port page

SOIL

Profile Description: Depth	(Decentile et a							
Depth	(Describe to	the depth n	eeded to docum	nent the ir	ndicator o	or confirm	the absence of	indicators.)
CONCERNMENT OF CONCERNMENT	Matrix		Redox	x Features				
(inches) Colo	r (moist)	<u>%</u> (Color (moist)	%	Type'	Loc ²	Texture	Remarks
<u>0-410YR</u>	5/1	90 10)YR 5/4	10	<u> </u>	M	<u>SIL</u>	
4-13 10YR	6/1	100						
			-					
							 	
		<u> </u>	5					
	123		c			27		
¹ Type: C=Concentrat	ion, D=Deple	tion, RM=Red	duced Matrix, MS	S=Masked	Sand Gra	ains.	² Location: PL=F	Pore Lining, M=Matrix.
Hydric Soil Indicator	'S:	_	_				Indicator	rs for Problematic Hydric Soils ³ :
Histosol (A1)			Dark Surface	(S7)			2 cm	1 Muck (A10) (MLRA 147)
Histic Epipedon (A2)		Polyvalue Bel	low Surfac	ce (S8) (M	ILRA 147,	148) 📙 Coas	st Prairie Redox (A16)
Black Histic (A3)	(0.4)		Thin Dark Su	rface (S9)	(MLRA 1	47, 148)		1LRA 147, 148)
Hydrogen Sunde Stratified Lavers	(A4) (A5)		Loarny Gieye	a Mautx (F riv (F3)	-2)			M DA 136 147)
2 cm Muck (A10)	(LRR N)	Ť	Redox Dark S	Surface (Fi	6)			Shallow Dark Surface (TE12)
Depleted Below [Dark Surface	(A11)	Depleted Dar	k Surface	(F7)		D Othe	er (Explain in Remarks)
Thick Dark Surfa	ce (A12)]	Redox Depre	ssions (F8	3)			20 Zurich Brought Friedmann (1974) Friedmann (1974) Kitter (1975)
🔲 Sandy Mucky Mir	neral (S1) (LF	RRN,	Iron-Mangane	ese Masse	es (F12) (I	LRR N,		
MLRA 147, 14	8)	-	MLRA 136	5)			2	
Sandy Gleyed Ma	atrix (S4)	Ļ	Umbric Surfa	ce (F13) (MLRA 13	6, 122)	°Indicat	tors of hydrophytic vegetation and
Sandy Redox (SS)))())	Ļ	Piedmont Flo	odplain So	oils (F19)	(MLRA 14	8) wetlar	nd hydrology must be present,
Destrictive Laver (if	observed):			атепат (га		A 127, 147	unies:	s disturbed of problematic.
Tupo:	observeu).							
Type			,				Undria Cail Dr.	
Depth (inches):							Hydric Soli Pro	esent? res 🔽 No 🗔
Hydrolog these inu The north hydrology pine tree Sagittaria	y/Veg Note ndated are ern edge i /. In the we s that cann a latifolia, C	es Continue as are ope s forested est portion, ot tolerate Dicuta maci	ed: Areas clos en water, whili with a dense there is spara the waterlogg ulata and Lee	sest to E e the res shrub la se emer ged soil. rsia oryz	Bear Cre st has fil yer. Mu gent ver Other : zoides.	eek and t lled in wi lltiple dra getation species i	he beaver dar th herbaceous inages in this amongst a lay included fox so	ms are inundated. Some of s and woody plant species. area add to the wet ver of pine needs from dying edge, Bidens frondosa,

US Army Corps of Engineers

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

APPENDIX C – WETLAND GPS COORDINATES

	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	n fork and wester	n fork
	numbered se	parately; 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 2	1 omitted	
UT-B	Note: point 2	1 omitted	
UT-B	Note: point 2	1 omitted 35.9569764	-84.305771
UT-B	Note: point 2 1 2	1 omitted 35.9569764 35.9570799	-84.305771 -84.305887
UT-B	Note: point 2 1 2 3	1 omitted 35.9569764 35.9570799 35.9571920	-84.305771 -84.305887 -84.306002
UT-B	Note: point 2 1 2 3 4	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950	-84.305771 -84.305887 -84.306002 -84.306070
UT-B	Note: point 2 1 2 3 4 5	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130
UT-B	Note: point 2 1 2 3 4 5 6	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306028
UT-B	Note: point 2 1 2 3 4 5 6 7	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306028 -84.305924
UT-B	Note: point 2 1 2 3 4 5 6 7 8	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572249	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306028 -84.305924 -84.305890
UT-B	Note: point 2 1 2 3 4 5 6 7 8 9	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572249 35.9571827	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306028 -84.305924 -84.305890 -84.305890
UT-B	Note: point 2 1 2 3 4 5 6 7 8 9 10	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572895 35.9572249 35.9571827 35.9570121	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305924 -84.305863 -84.305863
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572895 35.9572249 35.9571827 35.9570121	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306028 -84.305924 -84.305890 -84.305863 -84.305743
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10 10 1	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572249 35.9571827 35.9571827 35.9570121	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305890 -84.305863 -84.305743
UT-B	Note: point 2 1 2 3 4 5 6 7 8 9 10 1 2 2	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9556813 35.9556813	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305924 -84.305863 -84.305743 -84.305743
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10 1 1 2 3 3	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.957363 35.9572895 35.9572895 35.9572895 35.9572895 35.9572895 35.9570121 35.9556813 35.9556249	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305863 -84.305863 -84.305743 -84.305943 -84.305943 -84.305915
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10 1 1 2 3 4 4 5 6 7 8 9 10 1 1 2 3 4	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572895 35.9572249 35.9571827 35.9570121 35.9556813 35.9556249 35.9556249 35.9556680	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305924 -84.305863 -84.305743 -84.305943 -84.305943 -84.305915 -84.305915
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10 1 1 2 3 4 5 6 7 8 9 10 1 1 2 3 4 5 6 7 8 9 10 1 1 1 2 1 1 2 1 1 5 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.957363 35.9572895 35.9572895 35.9572895 35.9572895 35.9570121 35.9570121 35.9556813 35.9556249 35.9556680 35.95566835	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.306130 -84.305924 -84.305924 -84.305863 -84.305743 -84.305743 -84.305915 -84.305792 -84.305792
UT-B	Note: point 2 1 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 6	1 omitted 35.9569764 35.9570799 35.9571920 35.9572950 35.9573513 35.9573063 35.9572895 35.9572249 35.9572249 35.9570121 35.9570121 35.9556813 35.9556813 35.9556835 35.9556835 35.9556835	-84.305771 -84.305887 -84.306002 -84.306070 -84.306130 -84.305924 -84.305924 -84.305863 -84.305743 -84.305943 -84.305915 -84.305915 -84.305762 -84.305762 -84.305762

	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	11	35.9585041	-84.310947
D10W-B	11 1 1	35.9585041 35.9579830	-84.310947 -84.310827
D10W-B	11 1 2	35.9585041 35.9579830 35.9579301	-84.310947 -84.310827 -84.310812
D10W-B	11 1 2 3	35.9585041 35.9579830 35.9579301 35.9579097	-84.310947 -84.310827 -84.310812 -84.310737
D10W-B	11 1 2 3 4	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652
D10W-B	11 1 2 3 4 5	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545
D10W-B	11 1 2 3 4 5 6	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458
D10W-B	11 1 2 3 4 5 6 7	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310432
D10W-B	11 1 2 3 4 5 6 7 8	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310432 -84.310357
D10W-B	11 1 2 3 4 5 6 7 8 9	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169 35.9577279	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310353
D10W-B	11 1 2 3 4 5 6 7 8 9 10	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578462 35.9578169 35.9577279 35.9576287	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310353 -84.310377
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169 35.9578169 35.9577279 35.9576287 35.9575973	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310309
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169 35.9577279 35.9577279 35.9576287 35.9575973	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310377 -84.310309 -84.310346
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12 13	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578462 35.9578462 35.9578169 35.9578169 35.9577279 35.9576287 35.9576287 35.9575973 35.9575826 35.9575138	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310346 -84.310285
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12 13 14	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169 35.9577279 35.9576287 35.9575973 35.9575973 35.9575826 35.9575138 35.9574521	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310346 -84.310285 -84.310277
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578462 35.9578169 35.9577279 35.9576287 35.9575973 35.9575973 35.9575138 35.9574521 35.9573703	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310346 -84.310285 -84.310202
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578462 35.9578169 35.9577279 35.9576287 35.9575973 35.9575973 35.9575826 35.9575138 35.9574521 35.9573703 35.9572968	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310346 -84.310285 -84.310202 -84.310167
D10W-B	11 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	35.9585041 35.9579830 35.9579301 35.9579097 35.9578892 35.9578395 35.9578697 35.9578462 35.9578169 35.9578169 35.9577279 35.9576287 35.9575973 35.9575973 35.9575973 35.9574521 35.9573703 35.9572968 35.9572116	-84.310947 -84.310827 -84.310812 -84.310737 -84.310652 -84.310545 -84.310458 -84.310458 -84.310357 -84.310357 -84.310377 -84.310346 -84.310285 -84.310277 -84.310202 -84.310167 -84.310106

	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			
	11	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	s boundary betw	een points 20
		and 1I	
NT11-C		and 1I	
NT11-C	1	and 11 35.9515169	-84.313148
NT11-C	1 2	and 11 35.9515169 35.9515886	-84.313148 -84.313196
NT11-C	1 2 3	and 11 35.9515169 35.9515886 35.9516269	-84.313148 -84.313196 -84.313240
NT11-C	1 2 3 4	and 11 35.9515169 35.9515886 35.9516269 35.9516867	-84.313148 -84.313196 -84.313240 -84.313306
NT11-C	1 2 3 4 5	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394
NT11-C	1 2 3 4 5 6	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415
NT11-C	1 2 3 4 5 6 7	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515916	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482
NT11-C	1 2 3 4 5 6 7 8	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515916 35.9515351	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534
NT11-C	1 2 3 4 5 6 7 8 9	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515916 35.9515351 35.9514715 35.9514416	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577
NT11-C	1 2 3 4 5 6 7 8 9 10	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515351 35.9514715 35.9514416 35.9513988	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577 -84.313692
NT11-C	1 2 3 4 5 6 7 8 9 10 11	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9516577 35.9515351 35.9515351 35.9514715 35.9514416 35.9513988 35.9513211	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577 -84.313692 -84.313741
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515916 35.9514715 35.9514715 35.9514416 35.9513211 35.9513211	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577 -84.313692 -84.313741 -84.313869
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12 13	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9516577 35.9515351 35.9514715 35.9514416 35.9513988 35.9513211 35.9512323 35.9511777	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577 -84.313577 -84.313692 -84.313869 -84.313919
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12 13 14	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515351 35.9514715 35.9514715 35.9514416 35.9513211 35.9513211 35.9512323 35.9511527	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313415 -84.313534 -84.313577 -84.313692 -84.313741 -84.313869 -84.313919 -84.314015
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515351 35.9514715 35.9514715 35.9514416 35.9513211 35.9512323 35.9511227 35.9511527 35.9511448	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313534 -84.313577 -84.313577 -84.313692 -84.313869 -84.313919 -84.313910
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515351 35.9514715 35.9514715 35.9514416 35.9513211 35.9512323 35.9511277 35.9511527 35.9511448 35.9511139	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313415 -84.313534 -84.313577 -84.313692 -84.313741 -84.313869 -84.313910 -84.313910 -84.313860
NT11-C	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	and 11 35.9515169 35.9515886 35.9516269 35.9516867 35.9516577 35.9515916 35.9515351 35.9514715 35.9514715 35.9514416 35.9513211 35.9512323 35.9511277 35.9511527 35.9511527 35.9511448 35.9511139	-84.313148 -84.313196 -84.313240 -84.313306 -84.313394 -84.313415 -84.313482 -84.313577 -84.313577 -84.313577 -84.313692 -84.313869 -84.313910 -84.313860 -84.313769

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	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
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	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			
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BCK-A	1 2	35.9530388 35.9530859	-84.308272 -84.308396
BCK-A	1 2 3	35.9530388 35.9530859 35.9530811	-84.308272 -84.308396 -84.308498
BCK-A	1 2 3 4	35.9530388 35.9530859 35.9530811 35.9530440	-84.308272 -84.308396 -84.308498 -84.308531
BCK-A	1 2 3 4 5	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716
BCK-A	1 2 3 4 5 6	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529799	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815
BCK-A	1 2 3 4 5 6 7	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529799 35.9529877	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888
BCK-A	1 2 3 4 5 6 7 8	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529799 35.9529877 35.9528619	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016
BCK-A	1 2 3 4 5 6 7 8 9	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529799 35.9529877 35.9528619 35.9527737	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016 -84.309282
BCK-A	1 2 3 4 5 6 7 8 8 9 10	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529877 35.9528619 35.9527737 35.9526913	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016 -84.309282 -84.309341
BCK-A	1 2 3 4 5 6 7 8 9 10 11	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529799 35.9529877 35.9528619 35.9528619 35.9526913 35.9526913	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016 -84.309282 -84.309341 -84.309510
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529799 35.9528619 35.9527737 35.9526913 35.9526913 35.9525429 35.9524635	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016 -84.309282 -84.309341 -84.309510 -84.309514
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529877 35.9528619 35.9528619 35.9526913 35.9526913 35.9526913 35.9524635 35.9523930	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308815 -84.309016 -84.309282 -84.309341 -84.309510 -84.309514 -84.309585
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13 14	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529799 35.9529877 35.9528619 35.9528619 35.9526913 35.9526913 35.9525429 35.9524635 35.9523930 35.9523455	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308815 -84.309016 -84.309282 -84.309341 -84.309510 -84.309514 -84.309585 -84.309650
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529877 35.9528619 35.9527737 35.9526913 35.9526913 35.9524635 35.9523930 35.9523455 35.9523105	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308716 -84.308815 -84.309016 -84.309282 -84.309341 -84.309510 -84.309514 -84.309550 -84.309650 -84.309861
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529799 35.9529877 35.9528619 35.9528619 35.9526913 35.9526913 35.9525429 35.9524635 35.9523405 35.9523105 35.9522631	-84.308272 -84.308396 -84.308396 -84.308498 -84.308531 -84.308716 -84.308815 -84.308888 -84.309016 -84.309282 -84.309282 -84.309510 -84.309514 -84.309514 -84.309550 -84.309650 -84.309993
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529799 35.9528619 35.9527737 35.9526913 35.9526913 35.9524635 35.9523405 35.9523405 35.9523105 35.9522631 35.9522311	-84.308272 -84.308396 -84.308498 -84.308531 -84.308716 -84.308716 -84.308815 -84.309888 -84.309016 -84.309282 -84.309341 -84.309514 -84.309514 -84.309585 -84.309650 -84.309861 -84.30993 -84.310064
BCK-A	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	35.9530388 35.9530859 35.9530811 35.9530440 35.9529392 35.9529392 35.9529799 35.9529877 35.9528619 35.9528619 35.9526913 35.9526913 35.9526913 35.9526913 35.9524635 35.9523455 35.9523405 35.9523105 35.9522631 35.9522311 35.9522237	-84.308272 -84.308396 -84.308396 -84.308531 -84.308716 -84.308815 -84.308815 -84.309016 -84.309282 -84.309282 -84.309510 -84.309514 -84.309514 -84.309585 -84.309650 -84.309861 -84.309993 -84.310064 -84.310177

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: southe	rn boundary in sl	napefile;
point 34 omit	ted	

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		2	3
3. In-channel structure: riffle-pool sequences	0	1 1	5 2	3
4. Sorting of soil textures or other substrate	0	1 1	5 2	3
5. Active/relic floodplain	0	1		3
6. Depositional bars or benches	0	1 1	.5 2	3
7. Braided channel	0		2	3
8. Recent alluvial deposits	0 6	25 0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts		1	2	3
11. Grade controls	0	0.5		1.5
12. Natural valley or drainageway	0	0.5		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	06	5 1	2	3
15. Water in channel and >48 hours since sig. rain	0		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	25 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		0
21. Rooted plants in channel ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	00	25 0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	5 1	2	3
26. Filamentous algae; periphyton		1	2	3
27. Iron oxidizing bacteria/fungus	9	0.5	1	1.5
28.Wetland plants in channel ²	0	D.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 sectio nwith 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 fiberous 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

SR VENDOR REPORTED AND A CONTRACTOR AND A	and president the second of stranding and	Providence Contraction and the second s		
County: Roane	Named Waterbody: Bear Creek Date/Time: 2/13/17 090			
Assessors/Affiliation:Trent Jett, Jam	Project ID :			
Site Name/Description: D10W - trib				
Site Location: Just west of NT10		* 		
USGS quad: Bethel Valley	Lat/Long: 35.956617			
Previous Rainfall (7-days) : 0.74 inc	-84.309787			
Precipitation this Season vs. Normal Source of recent & seasonal precip data :	: very wet wet average	dry drought unknown		
Watershed Size : 0.03 square miles	Photos: Y or N	(circle) Number :		
Soil Type(s) / Geology : Source:				
Surrounding Land Use : Forested w	ith two road crossings to south. Some	wetlands created in channel.		
Degree of historical alteration to nat Severe	ural channel morphology & hydrology (c Moderate	vircle one & describe fully in Notes) : Absent		

Primary Field Indicators Observed

Pri	mary 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		Stroom
	aquatic phase		Stream
6.	Presence of fish (except Gambusia)		Stream
7.	Presence of naturally occurring ground water table connection		Stream
8.	Flowing water in channel and 7 days since last 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.

Secondary Field Indicator Evaluation

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

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

C. Biology (Subtotal =)	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	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel 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 = _

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

Notes :

APPENDIX E – FOREST INVENTORY TABLES

	Area (Acres)				
Habitat	South of Bear	North of Bear	Total EMDF		
Type	Creek Road	Creek Road Creek Road			
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 E1. Acreage of land use types within the proposed EMDF site.

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

			Basal Area (ft ²)		
		Trees $(dbh > 10.0)$	Saplings (2 > dbh <	All tally trees (dbh >	
Scientific Name	Common Name	inches)	<u>10.0 inches)</u>	2.0 inches)	Merchantable
Acer negundo	box elder	18	0	18	
Acer rubrum	red maple	783	765	1,548	249
Acer saccharum	sugar maple	18	18	36	18
Asimina triloba	paw paw	0	18	18	
Carpinus caroliniana	iron wood	0	53	53	
Carya cordiformis	bitternut hickory	18	0	18	18
Carya glabra	pignut hickory	107	53	160	71
Carya pallida	pale hickory	18	0	18	
Carya tomentosa	mockernut hickory	18	53	71	18
Cercis canadensis	redbud	0	18	18	
Cornus florida	flowering dogwood	0	302	302	
Fagus grandifolia	American beech	107	178	285	
Fraxinus sp.	ash	53	53	107	18
Juglans nigra	black walnut	0	18	18	
Juniperus virginiana	red cedar	89	107	196	89
Liquidambar styraciflua	sweetgum	480	694	1,174	302
Liriodendron tulipifera	tulip poplar	1,281	534	1,815	1,068
Nyssa sylvatica	black gum	0	231	231	
Oxydendrum arboreum	sourwood	71	409	480	
Pinus echinata	short-leaf pine	160	0	160	142
Pinus strobus	white pine	125	0	125	125
Pinus taeda	loblolly pine	267	676	943	214
Pinus virginiana	Virginia pine	249	142	391	125
-----------------------	------------------	-------	-------	--------	-------
Platanus occidentalis	sycamore	53	0	53	
Prunus serotina	black cherry	71	214	285	18
Quercus alba	white oak	872	214	1,085	712
Quercus coccinea	scarlet oak	36	36	71	18
Quercus falcata	southern red oak	160	89	249	125
Quercus montana	chestnut oak	125	0	125	89
Quercus rubra	northern red oak	214	18	231	142
Quercus stellata	post oak	36	36	71	36
Quercus velutina	black oak	18	0	18	18
Sassafras albidum	sassafras	36	0	36	
Ulmus alata	winged elm	0	53	53	
Ulmus americana	American elm	18	0	18	
Ulmus rubra	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 BearCreek Road.

		Basal Area (sq. ft)					
		Trees	Saplings (2	All tally trees			
		(dbh > 10.0)	> dbh < <u>10.0</u>	(dbh > 2.0)	Merchantible		% of sapling
Genus	Common Name	inches)	inches)	inches)	basal area	% of Trees BA	BA
Quercus	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%
Liriodendron	tulip poplar	1,281	534	1,815	1,068	18.7%	7.8%
Acer	maple	818	783	1,601	267	11.9%	11.4%
Liquidambar	sweet gum	480	694	1,174	302	7.0%	10.1%
Pinus	pine	801	818	1,619	801	11.7%	11.9%
Carya	hickory	160	107	267	107	2.3%	1.6%
Nyssa	black gum	0	231	231		0.0%	3.4%
Prunis	cherry	71	214	285	18	1.0%	3.1%
Oxydendrum	sourwood	71	409	480		1.0%	6.0%
Juniperus	red cedar	89	107	196	89	1.3%	1.6%
Asimina	paw-paw	0	18	18		0.0%	0.3%
Carpinus	ironwood	0	53	53		0.0%	0.8%
Cercis	redbud	0	18	18		0.0%	0.3%
Fagus	beech	53	53	107	18	0.8%	0.8%
Juglans	walnut	0	18	18		0.0%	0.3%
Platanus	sycamore	53	0	53		0.8%	0.0%
Sassafras	sassafras	36	0	36		0.5%	0.0%
Ulmus	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.

			Sanlings 2				Sanlings 2	All tally	
		Trees dbh	> dbh <	All tally	Merchan-	Trees dbh	> dbh <	trees (dbh	
		> 10.0	10.0	trees (dbh	tible	> 10.0	10.0	> 2.0	Merchantible
Scientific Name	Common Name	inches	inches	> 2.0 in)	Trees	inches	inches	inches)	Trees
Liriodendron tulipifera	tulin poplar	1.027	3.695	4.722	730	10.7	38.5	49.1	7.6
Acer rubrum	red maple	814	4.764	5.578	220	8.5	49.6	58.1	2.3
Liquidambar styraciflua	sweetgum	540	7.018	7.558	321	5.6	73.0	78.7	3.3
Ouercus alba	white oak	533	1.291	1.824	388	5.5	13.4	19.0	4.0
Pinus virginiana	Virginia pine	243	719	962	111	2.5	7.5	10.0	1.2
Pinus taeda	loblolly pine	223	5,144	5,367	190	2.3	53.5	55.9	2.0
Pinus echinata	short-leaf pine	140	0	140	115	1.5	0.0	1.5	1.2
Ouercus falcata	southern red oak	116	1.074	1.190	95	1.2	11.2	12.4	1.0
Oxvdendrum arboreum	sourwood	115	2,431	2,546		1.2	25.3	26.5	0.0
Fagus grandifolia	American beech	113	1,690	1,803		1.2	17.6	18.8	0.0
Prunus serotina	black cherry	108	2,702	2,810	12	1.1	28.1	29.2	0.1
Ouercus rubra	northern red oak	108	169	277	80	1.1	1.8	2.9	0.8
Carva glabra	pignut hickory	99	125	224	72	1.0	1.3	2.3	0.7
Juniperus virginiana	red cedar	79	720	799	79	0.8	7.5	8.3	0.8
Pinus strobus	white pine	59	0	59	59	0.6	0.0	0.6	0.6
Quercus montana	chestnut oak	56	0	56	47	0.6	0.0	0.6	0.5
Sassafras albidum	sassafras	51	0	51		0.5	0.0	0.5	0.0
Platanus occidentalis	sycamore	40	0	40		0.4	0.0	0.4	0.0
Fraxinus sp.	ash	39	160	199	16	0.4	1.7	2.1	0.2
Acer negundo	box elder	26	0	26		0.3	0.0	0.3	0.0
Quercus coccinea	scarlet oak	22	277	299	4	0.2	2.9	3.1	0.0
Quercus stellata	post oak	22	242	264	22	0.2	2.5	2.7	0.2
Carya cordiformis	bitternut hickory	12	0	12	12	0.1	0.0	0.1	0.1
Quercus velutina	black oak	11	0	11	11	0.1	0.0	0.1	0.1
Carya pallida	pale hickory	9	0	9		0.1	0.0	0.1	0.0
Acer saccharum	sugar maple	7	60	67	7	0.1	0.6	0.7	0.1
Carya tomentosa	mockernut hickory	7	544	551	7	0.1	5.7	5.7	0.1
Ulmus americana	American elm	5	0	5		0.1	0.0	0.1	0.0
Asimina triloba	paw paw	0	194	194		0.0	2.0	2.0	0.0
Carpinus caroliniana	iron wood	0	836	836		0.0	8.7	8.7	0.0
Cercis canadensis	redbud	0	52	52		0.0	0.5	0.5	0.0
Cornus florida	flowering dogwood	0	6,088	6,088		0.0	63.4	63.4	0.0
Juglans nigra	black walnut	0	39	39		0.0	0.4	0.4	0.0
Nyssa sylvatica	black gum	0	2,990	2,990		0.0	31.1	31.1	0.0
Ulmus alata	winged elm	0	622	622		0.0	6.5	6.5	0.0
Ulmus rubra	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.

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

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

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

Acer negundobox elder11.7Acer nubrumred maple29.9Acer saccharumsugar maple22.3Asimina trilobapaw-paw4.1Carpinus carolinianairon wood6.2Carya glabrapignut hickory24.9Carya codiformisbitternut hickory16.8Carya codiformisbitternut hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.611.6Pinus strobuswhite pine33.21Pinus strobuswhite pine32.61Pinus serotinablack cherry16.21Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus montanachestnut oak33.81Quercus rubranothern red oak33.81Quercus rubranothern red oak36.61	Scientific name	Common Name	dbh of largest tally <u>tree</u> (inches)	Number of tally trees with dbh >= <u>30.0 inches</u>
Acer rubrumred maple29.9Acer saccharumsugar maple22.3Asimina trilobapaw-paw4.1Carpinus carolinianairon wood6.2Carya glabrapignut hickory24.9Carya cordiformisbitternut hickory16.8Carya a ordiformisbitternut hickory20.9Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Juniperis virginianaeastern red cedar18.7Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.00Oxydendrum arboreumsourwood11.6Pinus strobuswhite pine33.21Pinus strobuswhite pine32.21Pinus strobuswhite pine32.61Pinus serotinablack cherry16.20Quercus albawhite oak30.83Quercus coccineascarlet oak29.20Quercus rubanorthern red oak33.81Quercus rubanorthern red oak36.61	Acer negundo	box elder	11.7	
Acer saccharumsugar maple22.3Asimina trilobapaw-paw4.1Carpinus carolinianairon wood6.2Carya glabrapignut hickory24.9Carya glabrapignut hickory16.8Carya pallidasand hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.00Oxydendrum arboreumsourwood11.61Pinus strobuswhite pine33.21Pinus strobuswhite pine33.21Pinus strobuswhite pine32.61Pinus sterotinablack cherry16.20Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus rubrasouthern red oak33.81Quercus rubranothern red oak36.61	Acer rubrum	red maple	29.9	
Asimina trilobapaw-paw4.1Carpinus carolinianairon wood6.2Carya glabrapignut hickory24.9Carya cordiformisbitternut hickory16.8Carya pallidasand hickory19.0Carya pallidasand hickory20.9Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.00Oxydendrum arboreumsourwood11.6Pinus strobuswhite pine33.21Pinus strobuswhite pine32.21Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Purus serotinablack cherry16.20Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus rubranothern red oak36.61	Acer saccharum	sugar maple	22.3	
Carpinus carolinianairon wood6.2Carya glabrapignut hickory24.9Carya cordiformisbitternut hickory16.8Carya pallidasand hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus strobuswhite pine33.21Pinus strobuswhite pine33.21Pinus strobuswhite pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.20Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus montanachestnut oak33.81Quercus rubrasouthern red oak33.81Quercus rubranorthern red oak36.61	Asimina triloba	paw-paw	4.1	
Carya glabrapignut hickory24.9Carya cordiformisbitternut hickory16.8Carya pallidasand hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus strobuswhite pine33.21Pinus strobuswhite pine33.21Pinus strobuswhite pine32.61Prunus serotinablack cherry16.22Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus montanachestnut oak33.81Quercus rubrasouthern red oak36.61	Carpinus caroliniana	iron wood	6.2	
Carya cordiformisbitternut hickory16.8Carya pallidasand hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.00Oxydendrum arboreumsourwood11.6Pinus sechinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus strobuswhite pine32.61Prunus serotinablack cherry16.21Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus falcatasouthern red oak33.81Quercus rubranorthern red oak36.61	Carva glabra	pignut hickory	24.9	
Carya pallidasand hickory19.0Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus strobuswhite pine32.61Prunus serotinablack cherry16.21Quercus albawhite oak30.83Quercus albawhite oak33.81Quercus falcatasouthern red oak33.81Quercus rubranorthern red oak36.61	Carya cordiformis	bitternut hickory	16.8	
Carya tomentosamockernut hickory20.9Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus strobusvirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus falcatasouthern red oak38.01Ourcus rubranorthern red oak36.61	Carya pallida	sand hickory	19.0	
Cercis canadenseredbud7.9Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus albawhite oak30.831Quercus falcata31Quercus montanachestnut oak38.0101Quercus rubraporthern red oak36.611	Carya tomentosa	mockernut hickory	20.9	
Cornus floridaflowering dogwood4.8Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Ouercus rubranorthern red oak36.61	Cercis canadense	redbud	7.9	
Fagus grandifoliaAmerican beech30.51Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.00Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Ouercus rubranorthern red oak36.61	Cornus florida	flowering dogwood	4.8	
Fraxinus sp.ash18.3Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcataQuercus montanachestnut oak38.01Quercus montanachestnut oak36.61	Fagus grandifolia	American beech	30.5	1
Juglans nigrablack walnut9.1Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubranorthern red oak36.61	Fraxinus sp.	ash	18.3	
Juniperis virginianaeastern red cedar18.7Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubranorthern red oak36.61	Juglans nigra	black walnut	9.1	
Liquidambar styracifluasweetgum27.4Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubranorthern red oak36.61	Juniperis virginiana	eastern red cedar	18.7	
Liriodendron tulipiferatulip poplar37.41Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubranorthern red oak36.61	Liquidambar styraciflua	sweetgum	27.4	
Nyssa sylvaticablack gum6.0Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Liriodendron tulipifera	tulip poplar	37.4	1
Oxydendrum arboreumsourwood11.6Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Nyssa sylvatica	black gum	6.0	
Pinus echinatashort-leaf pine17.3Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Oxydendrum arboreum	sourwood	11.6	
Pinus strobuswhite pine33.21Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Pinus echinata	short-leaf pine	17.3	
Pinus taedaloblloly pine22.9Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Pinus strobus	white pine	33.2	1
Pinus virginianaVirginia pine18.7Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Pinus taeda	loblloly pine	22.9	
Platanus occidentalissycamore32.61Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Pinus virginiana	Virginia pine	18.7	
Prunus serotinablack cherry16.2Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Platanus occidentalis	sycamore	32.6	1
Quercus albawhite oak30.83Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Prunus serotina	black cherry	16.2	
Quercus coccineascarlet oak29.2Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Quercus alba	white oak	30.8	3
Quercus falcatasouthern red oak33.81Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Quercus coccinea	scarlet oak	29.2	
Quercus montanachestnut oak38.01Quercus rubraporthern red oak36.61	Quercus falcata	southern red oak	33.8	1
<i>Ouercus rubra</i> northern red oak 36.6 1	Quercus montana	chestnut oak	38.0	1
	Quercus rubra	northern red oak	36.6	1
Quercus stellata post oak 19.1	Quercus stellata	post oak	19.1	
Quercus velutina black oak 17.0	Quercus velutina	black oak	17.0	
Sassafras albidum sassafras 11.8	Sassafras albidum	sassafras	11.8	
Ulmus alata winged elm 4.8	Ulmus alata	winged elm	4.8	
<i>Ulmus americana</i> American elm 26.8	Ulmus americana	American elm	26.8	
<i>Ulmus rubra</i> slippery elm 2.4	Ulmus rubra	slippery elm	2.4	

Total >= 30.0

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APPENDIX F – OBSERVED BIRD SPECIES. STATUS AND HABITAT REQUIREMENTS

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

Field SparrowSpizella pusillayear-round residentbrushy fieldsGray CatbirdDumetella carolinensissummer residentshrubby second growth; forest undergrowth, forest edgeHooded WarblerSetophaga citrinasummer residenthillsides and ravines in mature forest, bottomland hardwoodIndigo BuntingPasserina cyaneasummer residentshrubby fields, second growth, forest edge
Gray CatbirdDumetella carolinensissummer residentshrubby second growth; forest undergrowth, forest edgeHooded WarblerSetophaga citrinasummer residenthillsides and ravines in mature forest, bottomland hardwoodIndigo BuntingPasserina cyaneasummer residentshrubby fields, second growth, forest edge
carolinensisundergrowth, forest edgeHooded WarblerSetophaga citrinasummer residenthillsides and ravines in mature forest, bottomland hardwoodIndigo BuntingPasserina cuaneasummer residentshrubby fields, second growth, forest edge
Hooded WarblerSetophaga citrinasummer residenthillsides and ravines in mature forest, bottomland hardwoodIndigo BuntingPasserina cyaneasummer residentshrubby fields, second growth, forest edge
Indigo Bunting Passerina cyanea summer resident shrubby fields, second growth, forest edge
Kentucky Warbler ^a <i>Geothlypis</i> summer resident mature forest with developed undergrowth
formosa
Mourning Dove Zenaida year-round resident fields and open areas, suburban
macroura
Northern Cardinal <i>Cardinalis</i> year-round resident widespread
cardinalis
Northern Flicker <i>Colaptes auratus</i> year-round resident open forest, forest edge; sometimes
agricultural fields
Northern ParulaSetophagasummer residentwooden swamps, riparian areas in lowland
americana forests
OvenbirdSeiurussummer residentmature hardwood forest
aurocapilla
PileatedDryocopusyear-round residentmature forest
Woodpecker <i>pileatus</i>
Pine WarblerSetophaga pinusyear-round residentconiferous forest, mixed coniferous-
deciduous forest
Prairie Warbler Setophaga summer resident shrubby fields, secondary growth
discolor
Red-bellied Melanerpes year-round resident forest
woodpecker carolinus
Red-eyed Vireo Vireo olivaceus summer resident hardwood forest
Red-shoulderedButeo lineatusyear-round residentforest and forest edgeHawkImage: State of the state of th
Red-tailed Hawk Buteo jamaicensis year-round resident open field and forest edge
Ruby-throatedArchilochussummer residentopen hardwood, forest edge, suburban
Hummingbird colubris
Scarlet Tanager <i>Piranga olivacea</i> summer resident mature hardwood forest
Eastern Screech Megascops asio year-round resident forest Owl
Summer Tanager <i>Piranga rubra</i> summer resident deciduous and mixed forest, forest edge
Swainson's Thrush Catharus migrant forest and forest edge
ustulatus
Tufted Titmouse Baeolophus year-round resident widespread
bicolor
Turkey Vulture <i>Cathartes aura</i> year-round resident open areas, wooded areas, urban, suburban
White-breasted Sitta carolinensis year-round resident hardwood forest and forest ego
White-eyed Vireo Vireo griseus summer resident forest edges, dense forest undergrowth

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

^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