# A06 070305 503 Env. Document Type: Corps of Engineers Correspondence

March 8, 2007

Mr. Mike Lee
Natural Resources Section
Tennessee Department of Environment
and Conservation
7th Floor L&C Annex
401 Church Street
Nashville, Tennessee 37243

Dear Mr. Lee:

TENNESSEE VALLEY AUTHORITY (TVA) - KINGSTON FOSSIL PLANT (KIF) - FLUE GAS DESULFURIZATION (FGD) DISPOSAL PROJECT - TENNESSEE AQUATIC RESOURCE ALTERATION AND CORPS OF ENGINEERS (COE) - APPLICATION FOR PERMIT FOR ALTERATION OF WETLAND AREAS IN PROPOSED GYPSUM DISPOSAL AREA

#### INTRODUCTION

TVA is in the process of constructing an FGD system to control sulfur dioxide (SO<sub>2</sub>) air emissions from the KIF fossil plant to meet requirements under the 1990 Clean Air Act Amendments and the Title IV regulations for the Acid Rain Program. By reducing SO<sub>2</sub> emissions, overall air quality will be improved. Synthetic gypsum will be produced by the reaction of SO<sub>2</sub> with limestone and oxygen in the scrubber absorber. The installation of the FGD system at KIF will necessitate additional disposal facilities for this coal combustion byproduct.

TVA plans to market as much of this synthetic gypsum as possible. In fact, an on-site processing/marketing facility is planned for processing 100% of the synthetic gypsum produced at KIF. Synthetic gypsum such as the material produced at KIF is used for wallboard and cement manufacturing and agricultural amendments. The success of synthetic gypsum marketing at KIF could be affected if gypsum quantity or quality is not as high as expected. Demand for KIF's synthetic gypsum could also become an issue in the future as more scrubbers are coming on line in the US and the supply of synthetic gypsum increases. For this reason, adequate disposal facilities for this material must be developed in the event that all of KIF's gypsum cannot be marketed.

An application has been submitted to Tennessee's Division of Solid Waste Management for the development of a disposal facility on a peninsula on the KIF reservation. The planned development of this disposal facility will be in two phases; however, the solid waste application has been made for the entire development. During Phase I, there will be impacts to two wetland areas (identified in enclosures as W3 and W4). Phase II will affect wetland areas W1, W1A, and W2. Phase I was sized to have sufficient capacity to allow time for the construction of the entire development if marketing fails. Due to the need to permit the entire site from a solid waste standpoint, TVA believes an appropriate approach for the 404 and Aquatic Resource Alteration Permit for wetlands alteration is to assume that these aquatic resources will be impacted at some time and proceed with permitting all impacts now.

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#### APPLICATION INFORMATION

Enclosed is an application packet which consists of a Corps of Engineers application form, a site map indicating affected areas, a detail map of the toe of slope of the FGD disposal area, a sketch of the proposed final elevations of the FGD facility, the wetlands delineation forms for wetland areas on the peninsula, a check for \$1000.00 to cover processing, and a proposal for compensatory mitigation.

#### **Alternative Disposal Locations Considered**

TVA examined several alternative disposal facility locations during the environmental assessment conducted for this project in addition to the proposed location on the KIF peninsula. For a prospective disposal site to be feasible from a solid waste permitting and construction standpoint, it must provide a minimum capacity for 5 years of operation if it is located at the plant site, or 20 years of operational capacity if it is located offsite. Both onsite and offsite disposal alternatives were considered and are summarized below:

- Berkshire Farm/Friche Farm This offsite area consists of two separate farms of approximately 157 acres each and is located upstream of KIF, on the opposite bank of the Emory River. Although this disposal area would provide ample capacity, approximately 30 years per farm, the site was rejected due to cost and logistics of transmission line relocation and gypsum transportation and the requirement of a drying system for disposal. There were also floodplain and topography issues with the site.
- Tip of KIF Peninsula This onsite area consists of approximately 28 acres southeast of the Kingston Wildlife Management Area and Refuge. A transmission line divides the area rendering a portion of the area unusable for disposal. This disposal alternative was rejected because it failed to meet the minimum required 5-year capacity.
- KIF Rail Loop This onsite area consists of approximately 40 acres and is located west of the KIF powerhouse. A 12 acre area of this disposal alternative is diverse wetlands of high quality. This disposal alternative was rejected because it failed to meet the minimum required 5-year capacity and its impacts to high quality wetlands.
- Abandoned Ash Pond Chemical Pond Area This onsite 37-acre area encompasses
  recreational fields and the active chemical treatment ponds. This disposal alternative was
  rejected because it failed to meet the minimum required 5-year capacity. In addition, the
  chemical ponds' disposal capacity would have to be replaced and there would have been
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- Coal Pile This onsite 13-acre area is located northwest of the KIF powerhouse. This
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  capacity.
- Trailer Court This offsite 7-acre area is located across the road from the KIF coal pile area. This disposal alternative was rejected because it failed to meet the minimum required 5-year capacity and it would have impacted non-TVA property owners.

- TVA Clinch River Breeder Reactor Site (CRBR) This offsite area meets the required 20-year capacity and is located 25 miles from KIF. However, there are significant geological and archeological/cultural resource issues at this site. Although this disposal area would provide ample capacity this site was rejected due to cost and logistics of long distance gypsum transportation, the requirement of a drying system for disposal, geological concerns, and the potential impacts to cultural resources.
- Active KIF Ash Pond This onsite disposal alternative would consist of the gypsum being co-located in the existing ash pond. Disposal in the facility's ash pond presents operational problems since gypsum, fly ash, and bottom ash all have different properties and handling could therefore be complex. It would also eliminate the ability to market gypsum due to the need for a continual gypsum supply for dredge cell construction. Additionally, the capacity of the existing ash pond is not unlimited and future additional disposal capacity for all combustion byproducts would have to be developed at a later date, probably only postponing the need for development of coal combustion byproduct disposal areas on the KIF peninsula. This alternative site was rejected due to the possible operational problems, the elimination of the gypsum material available to market and the future need for additional disposal areas.

### Avoided On-site Impacts and other Mitigating Factors

TVA utilized both their routine delineation form and a rapid assessment methodology (RAM) similar to the Ohio RAM. Initial evaluation of the proposed gypsum disposal site on the KIF peninsula resulted in a delineation of approximately 5.85 acres of wetlands that could possibly be impacted. Subsequent modifications in the design of the proposed footprint of the gypsum disposal facility have avoided impacts to approximately 1.04 acres, reducing the impact to approximately 4.81 acres. In addition, impacts to higher quality wetlands in the KIF rail loop area described below were avoided.

During the preliminary site visit conducted with you, TVA, and the COE in October, we found that the areas being impacted by the gypsum disposal area had fairly extensive coverage by invasive species and other features that indicated that the impacted areas were of only low to moderate wetlands quality. The impacts to wildlife habitat by the construction of the FGD disposal area were also thought to be minimal, as the open water feature would be replaced in the vicinity by the ponded area of the gypsum disposal site.

TVA is also proposing compensatory mitigation to be performed by an outside contractor. We are providing a copy of the mitigation proposal developed by MRW Properties. This proposal contains detail on enhancing 19.5 acres, which is sufficient capacity to mitigate all 4.81 acres on a 4:1 ratio. However, during the site visit in October, Division personnel suggested that the impacted areas actually may be less than the total acreage that TVA delineated due to the presence of significant open water and invasive species in the delineated footprint. The estimated acreage of the largest open water feature is 1.35 acres. Enclosed is an overlay of the feature shown as a shaded magenta area on a topographic map; an aerial map is also included which shows a significant amount of open water in the area described as AS3/W3. We would be interested in learning the final determination by the Division of the actual areas necessary to be mitigated for this project.

#### Additional Information

The development of the FGD disposal site would occur on an area managed by the Tennessee Wildlife Resources Agency (TWRA) that allows for limited hunting for waterfowl, deer, and dove. This refuge was established for interim use with the intent of converting the use of the property

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to industrial use when needed by TVA Kingston fossil plant operations. In recent years, TWRA has reported low usage of the area by hunters such that only limited wildlife management activities have occurred recently. Because the direct impacts from the proposed disposal facility are localized, TVA determined them to be insignificant since other areas suitable for hunting and wildlife management exist in the area.

Threatened and endangered species records indicate that there are several federally- or state-listed plant and animal species in the vicinity of KIF. However, during site field inspections of the proposed action area, it was determined that no federally- or state-listed species are present on the impacted lands or that impacts were unlikely to occur to listed species. Based on review of the TVA database, no sensitive aquatic animal species are known to occur in waters surrounding the project. A mussel survey conducted in October 2005 also failed to identify any sensitive species.

During construction, best management practices would be employed to minimize aquatic resources (including adjacent wetlands not being filled) as required under Tennessee's General Permit for Discharges Associated with Construction Activities, coverage number TNR190588.

Flood storage would not be significantly impacted by the gypsum landfill development on the KIF peninsula according to the Environmental Assessment completed for the FGD at KIF. It was determined that the loss was minimized under the TVA Flood Control Storage Loss Guidelines.

TVA is mandated under the National Historic Preservation Act and the Archaeological Resources Protection Act to protect significant archaeological resources and historic properties that may be affected by TVA actions. The State Historic Preservation Officer determined that there are no eligible archeological or historic sites within the project's footprint.

TVA looks forward to an expeditious issuance of the ARAP and COE permits. For purposes of meeting public notice requirements, please forward the required information for newspaper publishing and posting at the site to the following address.

Ben O'Brien TVA Kingston Fossil Plant 714 Swan Pond Road Harriman, Tennessee 37748

Email: wbobrien@tva.gov

TVA believes it would expedite the permitting process to request a public hearing on this matter so that the permit may be issued as soon as possible. Please make the necessary arrangements to hold a public hearing concurrently with the public notice. TVA would like to have the final permit no later than May 31, 2007.

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Gordon G. Park Manager of Environmental Affairs 5D Lookout Place

SCS:LPJ:SMF **Enclosures** cc (Enclosures):

Mr. Ruben Hernandez Regulatory Branch US Army Corps of Engineers 3701 Bell Road Nashville, Tennessee 37214

M. T. Beckham, KFP 1A-KST (w/o Enclosures) W. B. O'Brien, KFP 1A-KST

L. F. Campbell, KFP 1A-KST

B. K. Ellis, WT 11B-K

R. D. Nash, LP 2T-C

A. L. Smith, LP 5D-C (w/o Enclosures)

B. B. Walton, WT 6A-K (w/o Enclosures)

EDM, WT CA-K

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Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

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Gordon 6. Park

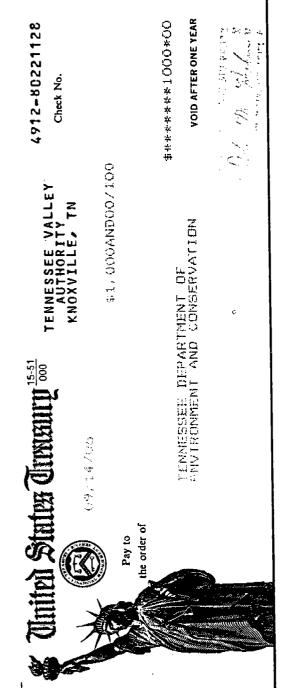
Manager of Environmental Affairs

5D Lookout Place

**Enclosures** 

cc: Mr. Ruben Hernandez Regulatory Branch US Army Corps of Engineers 3701 Bell Road

Nashville, Tennessee 37214



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# APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

OMB APPROVAL NO. 0710-003 Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Washington, DC 20303. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

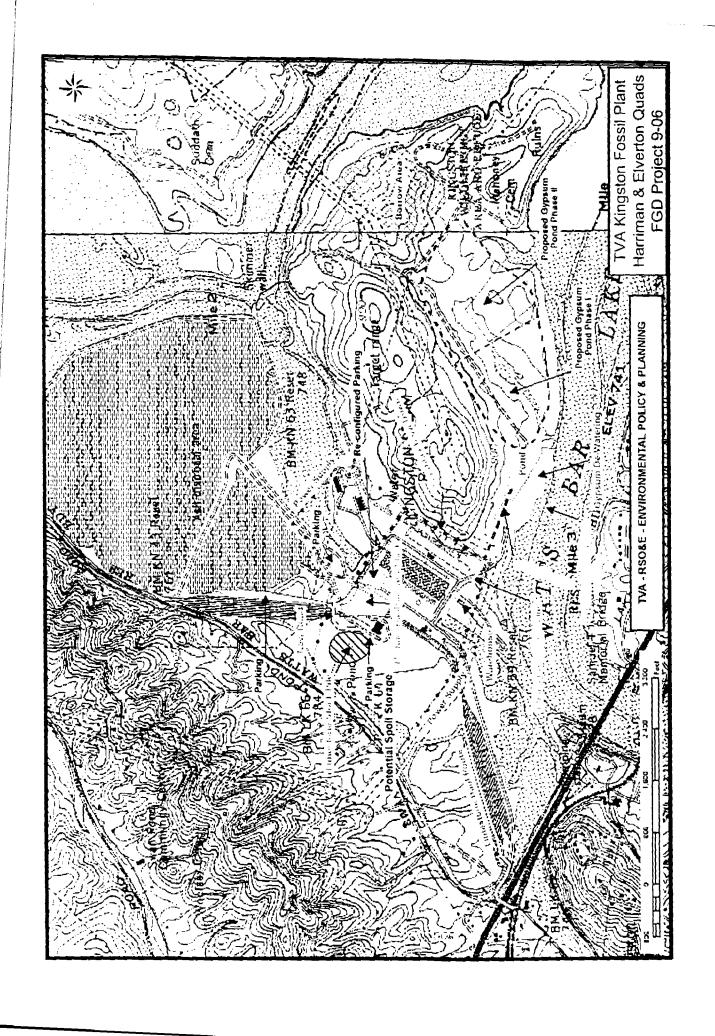
#### PRIVACY ACT STATEMENT

Authority: 33 USC 401. Section 10: 1413. Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

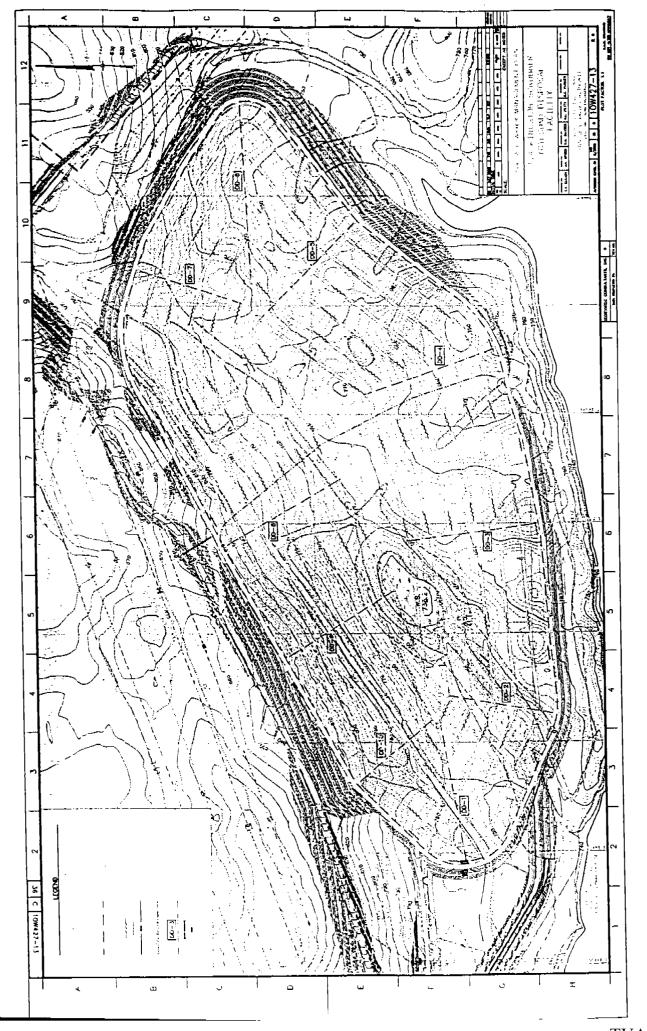
One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned

	(ITEMS I	THRU 4 TO BE FIL	LED BY TH	IE CORPS)
1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEI		4. DATE APPLICATION COMPLETED
	(ITEMS I	BELOW TO BE FILE	LED BY AP	PLICANT)
5. APPLICANT'S NAME	Robert Summers, Vice Presidence Fossil Projects	dent 8. A	UTHORIZE	ED AGENT'S NAME AND TITLE (an agent is not required, N/A
<ol> <li>APPLICANT'S ADDR TVA – Kingston Foss 1101 Market Street, I Chattanooga, Tenne</li> </ol>	sil Plant LP 3K	9. A	GENT'S AD	DDRESS
7. APPLICANT'S PHON	E NOS. W/AREA CODE	10.	AGENT'S F	PHONE NOS. W/AREA CODE
a. Residence b. Business (423) 75	51-2491		a. Residence b. Business	
11.		TATEMENT OF AU	TUODIZA	TION
I hereby authorize	s permit application. "S SIGNATURE	count us my agent mane	processing or	this application and to furnish, upon request, supplemental DATE
<del></del>	NAME LOCAT	ION AND DESCRIE	PTION OF I	PROJECT OR ACTIVITY
12. PROJECT NAME OF TVA Kingston Fossil P		<u> </u>		
	BODY, IF KNOWN (if applicable) r Reservoir), approximate river m	nile 3, and		STREET ADDRESS (if applicable) - Kingston Fossil Plant
15. LOCATION OF PRO Roan COUN	eTN		714 9	Swan Pond Road man, TN 37763
16. OTHER LOCATION	DESCRIPTIONS, IF KNOWN, 1860	e instructions)		
17. DIRECTIONS TO T	HE SITE		<del></del>	

19. Project Purpose (Describe the reason or purpose of the project, see instructions)	
See #18 above.	
USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED	
20. Reason(s) for Discharge Placement of fill associated with construction and operation of FGD waste disposal facility.	_
21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards Combination of compacted clay, soil, rock, gypsum. Total quantities deposited in wetland area would depend upon marke disposal) and how gypsum was placed. The total estimated production of gypsum is between 349,000 and 560,000 tons p	ting (avoided per year.
<ol> <li>Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)</li> <li>4.81 acres in wetlands and embayments/conveyances.</li> </ol>	
23. Is Any Portion of the Work Already Complete? Yes No X IF YES, DESCRIBE THE COMPLETED WORK No construction has occurred associated with this phase of the project.	
24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).	
TVA - Kingston Fossil Plant	
25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Ap	oplication.
AGENCY TYPE APPROVAL* IDENTIFICATION NUMBER DATE APPLIED DATE APPROVED DATE I Tennessee Aquatic Resource Alteration Permit and Corps of Engineers permit being applied for. General Permit for Storm Water associated with construction activity has already been obtained for other project impacts and this location.	DENIED  I future impacts in
* Would include but is not restricted to zoning, building and flood plain permits  26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorical applicant.  317/07	this application is ized agent of the
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE	Ē
The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly a the statement in block 11 has been filled out and signed.	authorized agent if
18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United State willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent state representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements of fined not more than \$10,000 or imprisoned not more than five years or both.	ements or
*U S.GPO	0:1994-520-478.82018



TVA - RSO&E - R&TA - GEOGRAPHIC INFORMATION & ENGINEERING 2006



TVA - RSORE - R&TA - GEOGRAPHIC INFORMATION & ENGINEERING 2006



### Wetlands Report Text - October 2005

On October 13 and 17, 2005, a ground survey was conducted within the proposed project areas on the TVA KIF property to identify jurisdictional wetlands. Four wetlands were found (W1/W1A, W2, W3, and W4) and classified according to the Cowardin system (Cowardin et al., 1979). These wetlands are depicted on enclosures. Wetland determinations were performed according to USACE standards, which require documentation of hydrophytic vegetation, hydric soil, and wetland hydrology (Environmental Laboratory, 1987; Reed, 1997). Broader definitions of wetlands, such as that used by the U.S. Fish and Wildlife Service (Cowardin et al., 1979), the Tennessee definition (Tennessee Code 11-14-401), and the TVA Environmental Review Procedures definition (TVA, 1983), were also considered in this review. In addition, the TVA Rapid Assessment Method (TVARAM) was used to assess wetland condition and identify wetlands with special ecological significance (Mack, 2001).

The following text and Table 1 describe the findings of the initial assessment. Acreage of impacts has been reduced due to the modification of footprint for the FGD disposal facility and is shown below in italics.

Wetland W1/W1A is a fringe wetland encompassing two drainage ways on site and extending along an embayment of Watts Bar Reservoir. This wetland is classified as palustrine forested and is approximately 1.3 acres in size. Dominant vegetation include silver maple (Acer saccharinum), Chinese privet (Ligustrum sinense), sweet gum (Liquidambar styraciflua), and smooth alder (Alnus serrulata).

Wetland W2 is formed in a small depression at the head of an on-site drainage way. It is classified as palustrine forested and is approximately 0.05 acre in size. It is hydrologically connected to W1W1A. Dominant vegetation includes silver maple, Chinese privet, red alder, and black willow (Salix nigra).

Note: reduction in impact to W1/W1A/W2 is ~1.04 acres.

Both W1/W1A and W2 are located within the proposed Gypsum Pond Phase 2 portion of the project area. Both wetland complexes meet USACE wetland determination standards and function in storm water retention, erosion control, and provision of wildlife habitat.

Wetland W3 consists of the fringe habitat along the channel/pond extending from the southwest through the center of the proposed Gypsum Pond Phase 1 project area. This complex is classified as palustrine forested and includes an open water pond and drainage channel connected to Watts Bar Reservoir. The majority of the drainage channel has been diked; however, wetland fringe habitat is present along the dike and extends through breaks in the dike. This wetland complex is approximately 3.9 acres in size and is dominated by sycamore (*Platinus occidentalis*), tulip poplar (*Liriodendron tulipifera*), smooth alder, Chinese privet, and silver maple.

Wetland W4 is a palustrine-forested complex connected hydrologically to W3 and located in the southwest corner of the Gypsum Pond Phase 1 project area. This area comprises 0.6 acre and receives hydrology from intermittent but temporary flooding associated with Watts Bar Reservoir water levels. Dominant vegetation includes Sweet

### Wetlands Report Text - October 2005

gum, red maple (Acer rubrum), Chinese privet, and Nepalese browntop (Microstegium vimineum).

Both W3 and W4 meet the U.S. Fish and Wildlife Service wetland definition and may be considered jurisdictional by the USACE under the Clean Water Act. Although the hydric soil parameter is absent in these wetland complexes, both wetlands appear to be the consequence of disturbance to the area's hydrologic regime. Ditching, diking, and channeling have altered drainage patterns such that hydrophytic vegetation dominates the temporarily or permanently saturated/inundated soils of these wetlands, although hydric soil indicators have not yet developed. Both wetland complexes function in storm water retention, erosion control, and provision of wildlife habitat.

	Tab	le 1 Affected V	Vetlands	
Wetland ID	Type <sup>a</sup>	Estimated Acreage	TVA RAM Score	TVA RAM Category
W1/W1A	PFO1B	~1.3	67.5	3
W2	PFO1C	~0.05	47.5	2
	subtotal	~1.35 acres 10/05 ~0.31 acres 9/06		
W3	PFO1E/PUB	~3.9	61	3
W4	PFO1A	~0.6	42	2
TOTAL		~5.85 acres 4.81 acres 9/06		

<sup>&</sup>lt;sup>a</sup> Based on Cowardin et al. (1979)

# TVA Natural Heritage Project Routine Wetland Determination Form

,	ct: Kinston FP EA	Investigator: Jimmy G	iroton/Britta D	imick	Normal (	Circum	stances:	Y	Sample ID:	W1	
Count	ty: Roane			1	Atypical	l Situati	ion:	Υ	Station or Structure Number(s):		
State:	; TN	Date: 10-13-2005		1	Problem	n Area:		N	Cowardin Code:	PF01B/	
Veg	etation										
	Plan	t Species	Stratum	Indica	ator		·····	P	lant Species	Stratum	Indicator
1.	Acer saccharinum		Tree	FAC	w	9.	Liquidam	uidambar styraciflua		Tree	FAC+
2.	Lycopus americanu	ıs	Forb	ОВ	L	10.	<del></del>		ıns	Vine	FAC
3.	Boehmeria cylindrid	cal	Forb	FAC	<del></del>		Cephalar	thus o	occidentalis	Shrub	OBL
4.	Ainus serrulata		Shrub	FAC	W+	12.	Impatien:	cape	nsis	Forb	FACW
5.			Tree	FAC	c	13.	Chelone	glabra	<del></del> .	Forb	OBL
6.	Microstegium vimineum		Forb	FAC	<b>&gt;</b>	14.			<del></del>	<del></del>	<del></del> -
7.	Cornus amomum		Shrub	FAC	W+	15.				<del> </del>	<del></del>
8.	Platanus occidenta	lis	Tree	FAC	W-	16.			<del></del>		<del></del>
Perce	ent of Dominant Sp	ecies That are OBL, FAC	W, or FAC:	100 %							
							<del></del>		<del></del>		
	Irology	<u> </u>		, <u></u>			<u> </u>				
Field	Observations:	1	Wetland Hydi	ology Inc	dicators:	:					
Dep	th of Surface Water:	(in.) I	Primary Indic	ators						Secondary In	dicators
_	45 An Francisco	Pit: (in.)	lou	ndated							
Deb	ith to Free Water in f	· · · · · · · · · · · · · · · · · · ·	1110	udated			(	Drift Lir	nes X	Oxidized Root	Channels
	ith to Free water in F th to Saturated Soil:	<del></del>			Upper 12	2 in.		Orift Lid Vater I		Oxidized Root Water Stained	
Dep		<del></del>	X Sat	turated in	-	2 in. 		Vater		Oxidized Root Water Stained	
Dep	oth to Saturated Soil: arks: ASB1 WWC	<del></del>	X Sat	turated in	-	2 in.		Vater	Marks	Water Stained	Leaves
Dep Rema Soil Soil U	oth to Saturated Soil: arks: ASB1 WWC	<del></del>	X Sat	turated in	-	2 in.	×	Vater	Marks		
Dep Rema Soil. Soil U	th to Saturated Soil: arks: ASB1 WWC  S Unit:	0 (in.)	X Sai	turated in diment De class:	epasits		× c	Vater	Marks ge Patterns  Listed hydric soil?	Water Stained	No
Dep Rema Soil. Soil U	arks: ASB1 WWC  S Unit:  Le Description:  pth (Inches)	0 (in.)  Matrix Color (Munsell M	X Sai	turated in	epasits		× c	Vater	Marks	Yes Tex	No
Dep Rema Soil. Soil U	arks: ASB1 WWC  S Unit:  Ie Description:  pth (Inches)  0-4	0 (in.)  Matrix Color (Munsell M	X Sai	turated in diment De class:	posits	unsell l	× c	Vater	Marks ge Patterns  Listed hydric soil?	Yes Tex	No No ture
Dep Rema Soil. Soil U	arks: ASB1 WWC  S Unit:  le Description: pth (Inches)  0-4  4-8	0 (in.)  Matrix Color (Munsell M 10YR4/3 10YR5/1	X Sai	class:	plors (Mu	unsell l	× c	Vater	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many	Yes Tex	No No Lure
Dep Rema Soil. Soil U	arks: ASB1 WWC  S Unit:  Ie Description:  pth (Inches)  0-4	0 (in.)  Matrix Color (Munsell M	X Sai	class:	posits	unsell l	× c	Vater	Marks ge Patterns  Listed hydric soil?	Yes Tex	No No Lure
Soil (Profil	arks: ASB1 WWC  S Unit:  Ie Description:  pth (Inches)  0-4  4-8  8-12+	0 (in.)  Matrix Color (Munsell M 10YR4/3 10YR5/1	X Sai	class:	plors (Mu	unsell l	× c	Vater	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many	Yes Tex	No No Lure
Dep Rema Soil ( Profil	arks: ASB1 WWC  S Unit:  le Description: pth (Inches)  0-4  4-8	0 (in.)  Matrix Color (Munsell M 10YR4/3 10YR5/1	X Sai	class:	plors (Mu	unsell l	× c	Vater	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many	Yes Tex	No No Lure
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Dep Rema Soil I Profil Dep	arks: ASB1 WWC  S Unit:  le Description: pth (Inches) 0-4 4-8 8-12+ ic Soil Indicators: Gleyed or Low Ch	0 (in.)  Matrix Color (Munsell M 10YR4/3 10YR5/1 10YR4/1	X Sai	class:  Mottle Co	olors (Mu 5YR4/6 YR4/6 (O	unsell l	X (	Vater Draina	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many  ORC  Aquic Mois	Yes Text Sidesture Regime	No No Rure
Dep Rema Soil ( Profil	arks: ASB1 WWC  S Unit:  Ie Description:  pth (Inches)  0-4  4-8  8-12+  ic Soil Indicators:  Gleyed or Low Ch Sulfidic Odor Concretions	0 (in.)  Matrix Color (Munsell M 10YR4/3 10YR5/1 10YR4/1	X Sai	class:  Mottle Co	olors (Mu 5YR4/6 YR4/6 (O	unsell l	X (	Vater Draina	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many  ORC  Aquic Mois	Yes  Tex: Significant State of the state of	No No Rure
Soil UProfil Det	arks: ASB1 WWC  S Unit:  Ie Description:  pth (Inches)  0-4  4-8  8-12+  ic Soil Indicators:  Gleyed or Low Ch Sulfidic Odor Concretions  arks:	Matrix Color (Munsell M 10YR4/3 10YR5/1 10YR4/1	X Sai	class:  Mottle Co	olors (Mu 5YR4/6 YR4/6 (O	unsell l	X (	Vater Draina	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many  ORC  Aquic Mois	Yes  Tex: Significant State of the state of	No No Lure
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Rema Soil U Profil De	arks: ASB1 WWC  S Unit:  le Description:  pth (Inches)  0-4  4-8  8-12+  ic Soil Indicators:  Gleyed or Low Ch Sulfidic Odor Concretions  arks:  nd Determinati ophytic Vegetation F	Matrix Color (Munsell M 10YR4/3 10YR4/1 10YR4/1 roma Colors  On Present? Yes	X Sai	class:  Mottle Co  Histic E  High O  Organic	5YR4/6 YR4/6 (O	unsell I	Moist)  Moist)	Vater Prainage Analysis and St. With With With With With With With With	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Many ORC  Aquic Mois Soils X Reducing Other (Exp	Yes  Tex  Signature Regime Conditions plain in Remark	No No Lure
Soil I Profil Det Rema	arks: ASB1 WWC  S Unit: Le Description: pth (Inches) 0-4 4-8 8-12+ Lic Soil Indicators: Gleyed or Low Ch Sulfidic Odor Concretions arks: Ind Determinati	Matrix Color (Munsell M 10YR4/3 10YR4/1 10YR4/1 roma Colors  On Present? Yes	X Satisfied Section 2015	class:  Mottle Co  Histic E  High O  Organic	5YR4/6 (O Epipedon organic Co c Streakir	unsell I	Moist)  Moist)	Vater  Prainage  andy St  USFV	Listed hydric soil?  Mottla Abundance  Many  ORC  Aquic Mois  Soils X Reducing  Other (Exp	Yes  Tex  Sid  Sture Regime Conditions blain in Remark	No No No No

Sample ID: W1	Photo	ID(s): #1-5				-		<del></del>		—-	
Flagging Description: 1-32							<del>.                                    </del>				
Drawing					<u> </u>						
_						-					
Please Include: North Arrow, F	roject Cent	erline, Survey	Corridor Bour	idaries, Le	ength of Wetland	Featu	ure, Distançes	from Cent	erline, Pr	noto L	ocations
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Obvious Connections to Naters of the US/State?	X Yes	<del></del>	Waterbody	/Watersh	ed: Clinch River						
Obvious Connections to Naters of the US/State? Primary Water Source	<del>-   -  </del>	No	Waterbody		ed: Clinch River Sheet Flow		Groundwater	X Prec	pitation	×	Other (Reservo
Obvious Connections to Naters of the US/State? Primary Water Source If other, note in comments)	<del>-   -  </del>	ip. Fringe	<del></del>				Groundwater	X Prec	pitation	×	
Obvious Connections to Waters of the US/State? Primary Water Source If other, note in comments) IVARAM SCORE: Description of Wetland and O	Ca	TVARAM (	Overbani	king ahitat (eat	Sheet Flow	engine	ar description o	<del></del>		↓	(Reservo
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Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)  TVARAM SCORE:  Description of Wetland and Coto ROW; erosion potential, exist	ther Comming disturbate	TVARAM (ents: (i.e. fornces, adjacent	Overbank CATEGORY: est age class; had use, wildli	king abitat feat ife observa	Sheet Flow	engine	ar description o	<del></del>		↓	(Reservo
Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)  TVARAM SCORE:  Description of Wetland and Coto ROW; erosion potential, exist	ther Comming disturbate	TVARAM (ents: (i.e. fornces, adjacent	Overbank CATEGORY: est age class; had use, wildli	king abitat feat ife observa	Sheet Flow	engine	ar description o	<del></del>		↓	(Reservo
Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)  TVARAM SCORE:  Description of Wetland and Oto ROW; crosion potential, exist  Wetland fringe on shore of emb  Fed by ASB1, ASB2, and ASB3	ther Comming disturbate	TVARAM (ents: (i.e. fornces, adjacent	Overbank CATEGORY: est age class; had use, wildli	king abitat feat ife observa	Sheet Flow	engine	ar description o	<del></del>		↓	(Reservo
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## TVA Natural Heritage Project Routine Wetland Determination Form

	Kinston FP EA Investigator: Jimmy Groton/Br			Iormal Circur	nstances:	Y	Sample ID:	W1A	
County: Roane			A	typical Situa	tion:	N	Station or Structure Number(s):	1	
State: TN	Date: 10-13-2005		P	roblem Area	:	Z	Cowardin Code:	PF01B	
Vegetation								- <del></del>	
Plant	Species	Stratum	Indicate	or	· · · <u>· · · · · · · · · · · · · · · · </u>	F	lant Species	Stratum	Indicator
1. Lonicera japonica		Vine	FAC-	9.	impatien.	s cape	ensis	Forb	FACW
2. Phytolacca amerian	a	Forb	FACU+	10.				<del></del>	-
3. Boehmeria cylindric	al .	Forb	FACW-	• 11,			·	<del></del>	<del> </del>
4. Alnus serrulata		Shrub	FACW+	12.			<del></del>		<del> </del>
5. Ligustrum sinense		Tree	FAC	13.					<del> </del> -
6. Microstegium vimine	eum	Forb	FAC+	14.			·····	<del>-  </del>	<del>                                     </del>
7. Campsis radicans		Vine	FAC	15.				-	<del> </del>
8. Platanus occidentali	s	Tree	FACW-	16.				<del></del>	<del> </del>
Percent of Dominant Spe	cies That are OBL, FAC	W, or FAC: {	88 %					·	<del></del>
Hydrology								<del> </del>	
Field Observations:		Vetland Hydro	ology Indic	ators:		<del></del>			
Depth of Surface Water:		rimary Indica						Secondary Ind	icators
Depth to Free Water in P			ndated			Orift Lin	nes X	Oxidized Root C	
Depth to Saturated Soil:									
Depth to Saturated Soil:	(in.)	Satu	urated in Up	oper 12 in.		Vater I	Marks	Water Stained L	eaves
Depth to Saturated Soil:	(in.)		urated in Up liment Depo					Water Stained L	eaves
Remarks: ASB2 WWC	(in.)						Marks ge Patterns	Water Stained L	eaves
	(m.)							Water Stained L	eaves
Remarks: ASB2 WWC	(m.)							Water Stained L	eaves
Remarks: ASB2 WWC	(III.)		iment Depa					Water Stained L	No
Remarks: ASB2 WWC Soils Soil Unit:	(III.)	Sed	iment Depa				ge Patterns		
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:	Aatrix Color (Munsell Mo	Sed	iment Depo		X	Oraina	ge Patterns		No
Remarks: ASB2 WWC Soils Soil Unit: Profile Description:		Sed	iment Depo	psits	X	Oraina	ge Patterns  Listed hydric soil?	Yes	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)	Matrix Color (Munsell Mo	Sed	class:	psits	X	Oraina	Listed hydric soil?	Yes	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3	Matrix Color (Munsell Mo	Sed	class:	rs (Munsell	X	Oraina	Listed hydric soil?	Yes Textu SiL SiCt	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1	Sed	class:	rs (Munsell 0YR 5/6	X	Oraina	Listed hydric soil?	Yes Textu	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1	Sed	class:	rs (Munsell 0YR 5/6	X	Oraina	Listed hydric soil?	Yes Textu SiL SiCt	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:	rs (Munsell 0YR 5/6	X	Oraina	Listed hydric soil?  Mottle Abundance  Many  Many	Yes Textu SiL SiCt	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:  Mottle Colo	rs (Munsell 0YR 5/6	X (	N	Listed hydric soil?  Many  Many  Aquic Mois	Yes Textu SiL SiCL SiCL	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  X Gleyed or Low Chro	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:  flottle Colo  thistic Epig	rs (Munsell  OYR 5/6  OYR 5/6	X (	Name of the second of the seco	Listed hydric soil?  Mottle Abundance  Many  Many  Aquic Mois  Soils X Reducing (	Yes Textu SiL SiCL SiCL	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  K Gleyed or Low Chro Sulfidic Odor Concretions	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:  flottle Colo  thistic Epig	rs (Munsell 0YR 5/6 0YR 5/6 pedon anic Cont. Su	X (	Name of the second of the seco	Listed hydric soil?  Mottle Abundance  Many  Many  Aquic Mois  Soils X Reducing (	Yes Textu SiL SiCU SiCU	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  X Gleyed or Low Chro Sulfidic Odor Concretions  Remarks:	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:  flottle Colo  thistic Epig	rs (Munsell 0YR 5/6 0YR 5/6 pedon anic Cont. Su	X (	Name of the second of the seco	Listed hydric soil?  Mottle Abundance  Many  Many  Aquic Mois  Soils X Reducing (	Yes Textu SiL SiCU SiCU	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  X Gleyed or Law Chro Sulfidic Odor Concretions  Remarks:  etland Determination	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Sed	class:  Mottle Colo  10  11  Histic Epig High Orga Organic S	rs (Munsell 0YR 5/6 0YR 5/6 pedon anic Cont. Su	Moist)  Moist)	N M	Listed hydric soil?  Mottle Abundance  Many  Many  Aquic Mois  Soils X Reducing (	Yes Textu SiL SiCU SiCU	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  X Gleyed or Low Chro	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Drainage Dist) M	class:  Mottle Color  Histic Epip High Organic S	rs (Munsell  OYR 5/6  OYR 5/6  pedon anic Cont. Su  Is this San	Moist)  Moist)  Inf. Layer Salandy Soils	Name of the state	Listed hydric soil?  Many Many Many Aquic Mois Soils X Reducing ( Other (Exp	Yes Textu SiL SiCt SiCt Sictions Sture Regime Conditions	No re
Remarks: ASB2 WWC  Soils  Soil Unit:  Profile Description:  Depth (Inches)  0-3  3-10  10+  Hydric Soil Indicators:  X Gleyed or Low Chro Sulfidic Odor Concretions  Remarks:  etland Determination  Hydrophytic Vegetation Profile  Hydrophytic Vegetation Profile  Hydrophytic Vegetation Profile  Hydrophytic Vegetation Profile  Soil Soil Soil Soil Soil Soil Soil Soil	Matrix Color (Munsell Mo 10YR 4/3 2.5Y 6/1 2.5Y 5/1	Drainage  Dist)  X  No	class:  Mottle Colo  10  11  Histic Epig High Orga Organic S	rs (Munsell  OYR 5/6  OYR 5/6  pedon  anic Cont. Su  Streaking in S  Is this San  Does area	Moist)  Moist)  Inf. Layer Salandy Soils	n name of the state of the stat	Listed hydric soil?  Many Many Many  Aquic Mois Soils X Reducing ( Other (Exp	Yes Textu SiL SiCU	No re

Sample ID: W1	Ph	oto ID(s)	: #1-5			_			····	<del>-</del>						
Flagging Description: 1-32		· · · · · · · · · · · · · · · · · · ·			·	<del></del>		<u> </u>								
Drawing		· · · ·	-													
Please Include: North Arrow, F	roject (	Centerline	Suga	v C	orridor Bound	ariae La	nacih of	Moderat		Distance	- (		stadies Dh			
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The second secon	÷															
Obvious Connections to Waters of the US/State?	×	Yes	N	0	Waterbody.	Waters	hed: Cli	nch River			-					
Obvious Connections to Naters of the US/State? Primary Water Source	×	Yes Cap. F	<del>-                                    </del>	0	Waterbody. Overbank		<del></del>	nch River	Gr	oundwate	r ×	( Pr	recipitation	×	C (Res	
Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)	×	Cap. F	ringe		Overbank		<del></del>		Gr	oundwate	r X	( Pr	recipitation	×	C (Res	other serve
Obvious Connections to Vaters of the US/State? Primary Water Source If other, note in comments)		Cap. F	ringe	A C	Overbank	ing	She	eet Flow	<u> </u>	•••		1		<u>                                     </u>	(Res	servo
Obvious Connections to Vaters of the US/State? Primary Water Source If other, note in comments) IVARAM SCORE:	Other (	Cap. F	Fringe VARAN	A C	Overbank  ATEGORY:  It age class; ha	ing bitat fea	She	eet Flow	gime:	description	ı of th	1		<u>                                     </u>	(Res	servo
Obvious Connections to Naters of the US/State? Primary Water Source If other, note in comments) IVARAM SCORE: Description of Wetland and to ROW; erosion potential, exis	Other C	Cap F T Comment	VARAN S: (i.e. fo	A Ca	Overbank  ATEGORY: It age class; ha	ing bitat fea	She	eet Flow	gime:	description	ı of th	1		<u>                                     </u>	(Res	servo
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Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)  TVARAM SCORE:  Description of Wetland and ( to ROW; erosion potential, exis	Other C	Cap F T Comment	VARAN S: (i.e. fo	A Ca	Overbank  ATEGORY: It age class; ha	ing bitat fea	She	eet Flow	gime:	description	ı of th	1		<u>                                     </u>	(Res	servo
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Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments) TVARAM SCORE: Description of Wetland and (to ROW; crosion potential, exis	Other C	Cap F T Comment	VARAN S: (i.e. fo	A Ca	Overbank  ATEGORY: It age class; ha	ing bitat fea	She	eet Flow	gime:	description	ı of th	1		<u>                                     </u>	(Res	
Obvious Connections to Waters of the US/State? Primary Water Source (If other, note in comments)  TVARAM SCORE:  Description of Wetland and to ROW; erosion potential, exis  Wetland fringe on shore of emfed by AS82	Other C	Cap F T Comment	VARAN S: (i.e. fo	A Ca	Overbank  ATEGORY: It age class; ha	ing bitat fea	She	eet Flow	gime:	description	ı of th	1		<u>                                     </u>	(Res	servo
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Cour	ct: Kinston FP EA hty: Roane	Investigator: Jimmy  Date: 10-13-2005	Grotor/Britta Di	At	ormal Circumstances: ypical Situation: oblem Area:	z z <	Sample ID: Station or Structure Number(s): Cowardin Code:	W2 PFO1/C	
Veg	etation	<u></u>					···	<u> </u>	<del></del>
	Plan	t Species	Stratum	Indicato	r	F	Plant Species	Stratum	Indicato
1.	Acer saccharinum		Tree	FACW	9.		· · · · · · · · · · · · · · · · · · ·		
2.	Salix nigra		Tree	OBL	DBL 10.				1
3.	Campsis radicans		Vine	FAC	11.				
4.	Alnus serrulata		Shrub FA		12.				
5.	Ligustrum sinense		Shrub	FAC	13.				
6.	<del>_</del>		·		14.	-			
7.			<del>_</del>		15.				
3.	<del></del>				16.			_	
Deg	oth to Free Water in F	(in.)	Sat	ndated urated in Up liment Depo	<del></del>		· <del></del>	Secondary Inc Oxidized Root Water Stained	
Der Rem <b>Soi</b>	oth to Saturated Soil: arks: Formed along	(in.)	Sat	urated in Up	<del></del>	Water	Marks	Oxidized Root	
Der Rem Soil	oth to Saturated Soil: arks: Formed along  Is Unit:	(in.)	Sat	urated in Up	<del></del>	Water	Marks	Oxidized Root	
Der Rem Soil Soil	oth to Saturated Soil: arks: Formed along  Is Unit: Ile Description:	(in.)	Sat Sec Drainage	urated in Up	sits X	Water	Marks ge Patterns	Oxidized Root Water Stained	No
Der Rem Soil Soil	arks: Formed along  Is  Unit:  ile Description:	(in.)	Sat Sec Drainage	urated in Up	<del></del>	Water	Marks ge Patterns	Oxidized Root Water Stained  Yes  Text	No ure
Der Rem Soil Prof	arks: Formed along  Is  Unit:  Ppth (Inches)  0-2	ASB2  Matrix Color (Munsell	Sat Sec Drainage	urated in Up diment Depo class:	sits X	Water	Marks ge Patterns  Listed hydric soil?	Oxidized Root Water Stained  Yes  Text	No No
Der Rem Soil Prof	arks: Formed along  Is Unit: Ile Description: O-2 2-5.5	Matrix Color (Munsell	Sat Sec Drainage	urated in Up liment Depo class: Mottle Colo	rs (Munsell Moist)	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common	Oxidized Root Water Stained  Yes  Text	No No Later to the
Rem Soi Soil	arks: Formed along  Is  Unit:  Ppth (Inches)  0-2	ASB2  Matrix Color (Munsell	Sat Sec Drainage	urated in Up liment Depo class: Mottle Colo	sits X	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance	Oxidized Root Water Stained  Yes  Text	No ure
Rem Soil Soil Prof	arks: Formed along  Is Unit: Ile Description: O-2 2-5.5	Matrix Color (Munsell	Sat Sec Drainage	urated in Up liment Depo class: Mottle Colo	rs (Munsell Moist)	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common	Oxidized Root Water Stained  Yes  Text	No ure
Rem Soil Soil Prof	arks: Formed along  Is  Unit:  Ppth (Inches)  0-2  2-5.5  5.5-13+	Matrix Color (Munsell	Sat Sec Drainage	urated in Up liment Depo class: Mottle Colo	rs (Munsell Moist)  OYR7/1  OYR7/6	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common	Oxidized Root Water Stained  Yes  Text	No No Later to the
Dep Rem Soil Prof De	arks: Formed along  Is  Unit:  Ile Description:  O-2  2-5.5  5.5-13+  ric Soil Indicators:	Matrix Color (Munsell	Sat Sec Drainage	class:  Mottle Colo	rs (Munsell Moist)  OYR7/1  OYR7/6	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common  Common	Oxidized Root Water Stained  Yes  Text  O  Sid	No No Later to the
Soil Prof De	arks: Formed along  Is Unit: Ile Description: O-2 2-5.5 5.5-13+  ric Soil Indicators: Gleyed or Low Chi Sulfidic Odor Concretions	Matrix Color (Munsell	Sat Sec Drainage	class:  Mottle Colo  1  Histic Epil	rs (Munsell Moist)  OYR7/1  OYR7/6	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common  Common  Aquic Mois Soils X Reducing	Oxidized Root Water Stained  Yes  Text  O  Sid	No No CC
Soil Prof De	arks: Formed along  Is  Unit:  Ile Description:  O-2  2-5.5  5.5-13+  ric Soil Indicators:  Gleyed or Low Chilling Codor	Matrix Color (Munsell	Sat Sec Drainage	class:  Mottle Colo  1  Histic Epil	rs (Munsell Moist)  0YR7/1  0YR7/6  pedon unic Cont. Surf. Layer	Water	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common  Common  Aquic Mois Soils X Reducing	Yes  Text  O  Signature Regime  Conditions	No No CC
Rem Soil Prof De Hyd X	arks: Formed along  Is Unit: Ile Description: Oth (Inches) O-2 2-5.5 5.5-13+  ric Soil Indicators: Gleyed or Low Chilonic Concretions warks:  and Determinati	Matrix Color (Munsell 7.5YR4/6 10YR7/1	Drainage	class:  Mottle Colo  1  Histic Epil High Orga	rs (Munsell Moist)  0YR7/1  0YR7/6  pedon  inic Cont. Surf. Layer  treaking in Sandy Soi	Water Draina	Marks ge Patterns  Listed hydric soil?  Mottle Abundance  Common  Common  Aquic Mois  Soils X Reducing Other (Exp	Yes  Yes  Text  O  SiG  Signature Regime  Conditions  plain in Remark:	No ure
Rem Soil Prof De Hyd X	arks: Formed along  Is Unit: Ille Description: Ppth (Inches) 0-2 2-5.5 5.5-13+  ric Soil Indicators: Gleyed or Low Chronications Barks: Band Determination Concretions Barks:	Matrix Color (Munsell 7.5YR4/6 10YR7/1 roma Colors	Drainage    Moist)	class:  Wottle Colo  Histic Epi High Organic S	rs (Munsell Moist)  0YR7/1  0YR7/6  pedon anic Cont. Surf. Layer streaking in Sandy Soi	Water Draina Sandy	Marks  ge Patterns  Listed hydric soil?  Mottle Abundance  Common  Common  Aquic Mois Soils X Reducing Other (Exp	Yes Yes X	No No No
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Wetland Descriptors Sample ID: W2

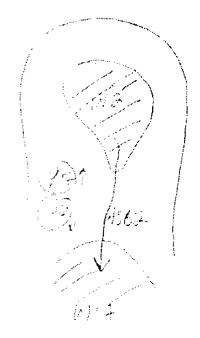
Flagging Description:

Photo ID(s): Photo 6 and 7

**Drawing** 

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

1)-2



**Obvious Connections to** Х Yes No Waterbody/Watershed: Clinch River Waters of the US/State? Primary Water Source Other Cap. Fringe Overbanking Sheet Flow Precipitation Groundwater (If other, note in comments) (Reservoir) TVARAM CATEGORY: **TVARAM SCORE:** 

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

Small wetland formed in a depression at head of ASB2.

							roject Routine Wetland Determination I						
Name	Proje	ct: Kinston FP EA	Investigator: Jimmy Gi	roton/Britta Di	mick	Norma	l Circum	stances:	Υ	Sample ID:	W3		
	Çour	ity: Roane				Atypica	al Situatio	on:	Y				
Plant Species	State	: TN	Date: 10-13-2005			Proble	m Area:		N		PFO	1E/PUBr	
Plant Species	Vec	etation			=	<del></del>							
Liriodendron tulipitera	<u> </u>		Species	Stratum	Indi	cator				Plant Species	5	tratum	Indicator
Boahmana cylindrical Fort FACW+ Ainus serutata Shrub FACW+ Ainus serutata Shrub FACW+ 11. Acar secchasinum Tree FACW Ainus serutata Shrub FACW+ 12. Lonicars japonica Vine FAC- Ligustrum sinense Shrub FACW+ 13. Salk nigra Tree OBL Microstagium viminium Fort FAC+ 14. Eleaagnus umbelioja Shrub Itaa virginica Shrub FACW+ 15. Acar rubrum Tree FAC Coccolus carolinus Vine FACW+ Coccolus carolinus Vine FACW+ Itaa Virginica Shrub FACW+ Itaa Virginica Coccolus carolinus Vine FACW+ Itaa Virginica Shrub FACW+ Itaa Virginica Coccolus carolinus Vine FACW+ Itaa Virginica Vine Virginica Vine Virginica Vine Vine FACW+ Itaa Virginica Vine FACW+ Itaa Vi	1.	Platanus occidentali	is	Tree	FAC	CW-	9.	Campsis radicans		ans		Vine	FAC
Anius serrulate    Shrub	2.	Liriodendron tulipife	iodendron tulipifera		F	AC	10.	Toxicodendron radicans			Vine	FAC	
Ligustrum sinense	3.	Boehmeria cylindric	neria cylindrical F		FAC	ACW+ 11.		Acer saccharinum		านกา		Tree	FACW
Microslegium vimineum	4.	Alnus serrulata			FAC	CW+	12.	Lonicera	japor	nica		Vine	FAC-
Itea virginica	5.	Ligustrum sinense		Shrub	F.	AC	13.	Şalix nig	ra			Tree	OBL
A content of Dominant Species That are OBL, FACW, or FAC: %    Vydrology   Vyd	6.	Microstegium vimine	eum	Forb	FA	VC+	14.	Elaeagn	us um	bellata		Shrub	
Secondary Indicators	7.	ltea virginica	·	Shrub	FA	¢w+	15.	Acer rub	rum		·  _	Tree	FAC
Wetland Hydrology   Indicators   Wetland Hydrology Indicators   Secondary Indicators   Se	8.	Coccolus carolinus	<del></del>	Vine ·	F	AC	16.	Elaeagn	us pu	ngens		Shrub	<u> </u>
Metand Hydrology Indicators:   Wetland Hydrology Indicators:   Secondary Indicators   Sec	Per	ent of Dominant Spe	ecies That are OBL, FAC	CW, or FAC:	%								
Metand Hydrology Indicators:   Wetland Hydrology Indicators:   Secondary Indicators   Sec	Hv	drology											
Depth of Surface Water in Pit: 5 (in.) Primary Indicators Secondary Indicators Oxidized Root Channels Depth to Free Water in Pit: 5 (in.) X Saturated in Upper 12 in. Water Marks Water Stained Leaves Sediment Deposits X Drainage Patterns    Post	_		<u> </u>	Wetland Hyd	rology l	ndicato	rs;						
Depth to Free Water in Pit: 5 (in.) Inundated Orifit Lines Oxidized Root Channels Population Saturated Soil: (in.) X Saturated in Upper 12 in. Water Marks Water Stained Leaves    Water Marks Water Stained Leaves   Water Stained Leaves	Da	anth of Surface Water									Seco	ndary Ind	dicators
Depth to Saturated Soil:  (in.) X Saturated in Upper 12 in. Valer Marks Valer Stained Leaves  Soils  Soils  Soils  Soil Unit:  Depth (Inches) Matrix Color (Munsell Moist) Mottle Colors (Munsell Moist) Mottle Abundance Texture  0-3 10YR 3/3 Sil. Sil.  3+ 10YR 5/3 Sil. Sil.  Sil.  Sil.  Sil.  Sil.  Sil.  Sil.  Sil.  Sil.  Sili.  Si			<del></del>	•								-	
Sediment Deposits X Drainage Patterns  Fooils  Fooil S  Frofile Description:  Depth (Inches) Matrix Color (Munsell Moist) Mottle Colors (Munsell Moist) Mottle Abundance Texture  0-3 10YR 3/3 SiL .  3- 10YR 5/3 SiCL  SiCL  Adjuic Colors  Gleyed or Low Chroma Colors  Sufficic Odor High Organic Cont. Surf. Layer Sandy Soils Reducing Conditions  Concretions  Organic Streaking in Sandy Soils Other (Explain in Remarks)  Femarks:  Fetland Determination  Hydrophytic Vegetation Present? Yes No Is this Sampling Point Within a USACE Wetland? Yes No Wetland Hydrology Present? Yes No Does area only meet USFWS wetland cefinition? Yes No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No Hydric Soils Present?	D€	opth to Free Water in F	Pit: 5 (in.)	Int	ındated				Drift L	ines	Oxidiz	ea Root (	Juanners
Soils  Soil Unit: Drainage class: Listed hydric soil? Yes No  Profile Description:  Depth (Inches) Matrix Color (Munsell Moist) Mottle Colors (Munsell Moist) Mottle Abundance Texture  0-3 10YR 3/3 SiL .  3+ 10YR 5/3 SiCL	De	epth to Saturated Soil:	(in.)	X Sa	turated	in Upper	12 in.		Wate	r Marks	Water	Stained I	_eaves
Soils    Drainage class:   Listed hydric soil?   Yes   No			<del></del>	Se	diment l	Deposits		X	Drain	age Patterns			
Soils    Drainage class:   Listed hydric soil?   Yes   No			<del></del>	<del></del>			<del></del>						
Drainage class:   Listed hydric soil?   Yes   No   No   Profile Description:   Single Profile   Drainage class:   Drain	Rer	marks:									=:		
Drainage class:   Listed hydric soil?   Yes   No   No   Profile Description:   Single Profile   Drainage class:   Drain	So	oils											
Depth (Inches) Matrix Color (Munsell Moist) Mottle Colors (Munsell Moist) Mottle Abundance Texture  0-3 10YR 3/3 SiL .  3+ 10YR 5/3 SiCL  Hydric Soil Indicators:  Gleyed or Low Chroma Colors Histic Epipedon Aquic Moisture Regime Sulfidic Odor High Organic Cont. Surf. Layer Sandy Soils Reducing Conditions Concretions Organic Streaking in Sandy Soils Other (Explain in Remarks)  Remarks:  etland Determination  Hydrophytic Vegetation Present? Yes No Is this Sampling Point Within a USACE Wetland? Yes No Wetland Hydrology Present? Yes No Does area only meet USFWS wetland definition? Yes No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No				Drainag	e class:					Listed hydric soil?	Ye	s	No
O-3 10YR 5/3 SIL .  3+ 10YR 5/3 SICL  4ydric Soil Indicators:  Gleyed or Low Chroma Colors Histic Epipedon Aquic Moisture Regime High Organic Cont. Surf. Layer Sandy Soils Reducing Conditions  Concretions Organic Streaking in Sandy Soils Other (Explain in Remarks)  Remarks:  6etland Determination  Hydrophytic Vegetation Present? Yes No Is this Sampling Point Within a USACE Wetland? Yes No Wetland Hydrology Present? Yes No Does area only meet USFWS wetland definition? Yes No Hydric Soils Present? Yes No Is wetland mapped on NWI? Yes X No	Pro	ofile Description:		<del></del>				TA,					_
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Metland Determination         Hydrophytic Vegetation Present?       Yes       No       Is this Sampling Point Within a USACE Wetland?       Yes       No         Wetland Hydrology Present?       Yes       No       Does area only meet USFWS wetland definition?       Yes       No         Hydric Soils Present?       Yes       No       Is wetland mapped on NWI?       Yes       X       No		Concretions			Org	anic Stre	aking in	Sandy Soi	ls	Other (Ex	oplain ii	n Remark	<u> </u>
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Estimated size.	Н	ydric Soils Present?	Ye	s 	No .		ls wetlar	d mapped	ipped on NWI?		Yes		
	E	stimated size.											

Drawing  Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations  City Company of the US/State?  Company Water Source  Cap Fringe Overbanking Sneet Flow Groundwater X Precipitation X City (Raservoling)  TVARAM SCORE: TVARAM CATEGORY:	Sample ID: W3	Ph	oto ID(	(s):								
Covious Connections to Waterbody/Watershed: Clinch River Water Source (for the ring) Water Source (Table Water Source (Table Water Source)	Flagging Description:	L		<del></del> .		<del></del>		<u> </u>			<u> </u>	<del></del>
Obvious Connections to Waters of the US/State? X Yes No Waterbody/Watershed: Clinch River Primary Water Source (if other, note in comments)  TVARAM CATEGORY:  Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)	Drawing											
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to ROW: erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)												
	Description of Wetland and Ot	her C	omme	ents: (	i.e. fore	st age class; hat	itat fea	tures; hydrologic reg	ime: description o	fthe	wetland outside	of or adjacent
FOIIOWS ASB3.		.g <b>U</b> .3			Jacon	A114 43C1 11114	. 00321	The state of the s	,			
	Follows ASBS.											
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# TVA Natural Heritage Project Routine Wetland Determination Form

Coun	ct: Kinston FP EA ity: Roane : TN	Investigator: Jimmy G	iroton/Kim Pila	arski	Atypic	al Circums al Situatio em Area:		Y	Sample ID: Station or Structure Number(s):	W4				
Veg	etation					m ruca.			Cowardin Code:	PFO1/	A			
		Species	Stratum	Indic	ator				Plant Species	1 6,,	ratum	Indicato		
1.	Platanus occidental	is	Tree			9.	Campsis		<del></del>	<del></del>	Ône	<del></del>		
2.	Carex tribuloides		Forb	FAC		<del></del>		Campsis radicans Toxicodendron radicans		<del> </del> -		FAC FAC		
3.	Boehmeria cylindric	al	Forb	FAC	W+	<del></del>	<del></del>			Vine	ree	FACW		
•	Lyquidambar styraciflua Tre		Tree	Tree FA		FAC				gutus		<del></del>	punp	FAC
5.	Lieuten de la companya de la company		Shrub	FA	4C		Bignonia			_	Vine	FAC		
3.	Microstegium vimin	eum	Forb	FA	C+		Acer neg			<del></del>	Tree	FACW		
7.	Carex crinita		Forb	FAC	W+		Acer rubr		<del></del>		Tree	FAC		
В.	Polygonum pennsyl	vanica	Forb	FAC	cw	<del></del>	Prunus s				Free	FACU		
Perce	ent of Dominant Spe	ecies That are OBL, FAC	W, or FAC:	94%		L			<del></del>			1700		
_	<del></del>													
	rology	<del></del>	<del></del>					<del></del>						
	Observations:		Vetland Hydr	ology In	ndicator	<b>s</b> :								
Dep	th of Surface Water:		rimary Indic	ators						Seconda	ary Indi	cators		
_														
	th to Free Water in P	it: (in.)	Inui	ndated			c	Orift Lie	nes	Oxidized	Root Cr	nannels		
	th to Free Water in F th to Saturated Soil:	it: (in.)			n Upper	12 in.			nes Marks	Oxidized Water Sta				
Dep	th to Saturated Soil:		Sat		• •	12 in.	v	Vater						
Dep Rema	th to Saturated Soil:		Sat	urated in	• •	12 in.	v	Vater	Marks					
Dep	th to Saturated Soil: arks:		Sat Sec	urated in	• •	12 in.	v	Vater	Marks ge Patterns	Water St		eaves		
Dep Rema Soil	th to Saturated Soil: arks: S		Sat	urated in	• •	12 in.	v	Vater	Marks					
Dep Rema Soil ( Profil	th to Saturated Soil: arks:  S Unit:	(in.)	Sat Sec Drainage	urated in liment D	eposits			Vater	Marks ge Patterns  Listed hydric soil?	Water St	ained Le	No		
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Dep Rema Soil ( Profi De	th to Saturated Soil:  arks:  S Unit:  le Description:  pth (Inches)  0-6  6-8  8-14+  ic Soil Indicators: \$  Gleyed or Low Chr.  Sulfidic Odor  Concretions	Matrix Color (Munsell M 2.5YR 4/6 2.5YR 5/6 7.5YR 4/6	Sat Sec Drainage	class:  Histic I  High C	olors (N	funsell M 4/2 n Cont. Surf.	v X C	Vater Draina	Marks  ge Patterns  Listed hydric soil?  Mottle Abundance  common  Aquic Moi Soils Reducing	Yes  Sture Regional Conditions	Textur SiCL SiCL SiCL	No No		
Soil I Profi	th to Saturated Soil:  arks:  S Unit:  le Description:  pth (Inches)  0-6  6-8  8-14+  ic Soil Indicators: \$  Gleyed or Low Chr.  Sulfidic Odor  Concretions	Matrix Color (Munsell M 2.5YR 4/6 2.5YR 5/6 7.5YR 4/6 Soil not hydric.	Sat Sec Drainage	class:  Histic I  High C	olors (N	funsell M 4/2 n Cont. Surf.	v X C	Vater Draina	Marks  ge Patterns  Listed hydric soil?  Mottle Abundance  common  Aquic Moi Soils Reducing	Yes  Sture Regional Conditions	Textur SiCL SiCL SiCL	No No		
Dep Rema Soil I Profi De	th to Saturated Soil:  arks:  S Unit:  le Description:  pth (Inches)  0-6  6-8  8-14+  ic Soil Indicators: \$  Gleyed or Low Chr Sulfidic Odor Concretions  arks:	Matrix Color (Munsell M 2.5YR 4/6 2.5YR 5/6 7.5YR 4/6 Soil not hydric. oma Colors	Sat Sec Drainage	class:  Mottle C  Histic I  High C	eposits  olors (N  10YR  Epipedo  Organic ( ic Streak	funsell M 4/2 n Cont. Surf.	v X C	Vater Draina andy S	Marks  ge Patterns  Listed hydric soil?  Mottle Abundance  common  Aquic Moi Soils Reducing	Yes  Sture Regional Conditions	Textur SiCL SiCL SiCL	No No		
Soil (Profile De Hydron Remark)	th to Saturated Soil:  arks:  S Unit:  le Description:  pth (Inches)  0-6  6-8  8-14+  ic Soil Indicators: \$  Gleyed or Low Chr. Sulfidic Odor Concretions  arks:  Ind Determination	Matrix Color (Munsell M 2.5YR 4/6 2.5YR 5/6 7.5YR 4/6 Soil not hydric. oma Colors	Sat Second Drainage	class:  Mottle C  Histic I  High C	olors (M 10YR Epipedo Organic (ic Streak	funsell M 4/2 n Cont. Surf. king in Sar	v X C	Vater Draina andy \$	Marks  ge Patterns  Listed hydric soil?  Mottle Abundance  common  Aquic Moi  Soils Reducing Other (Ex	Yes  Yes  Yes	Textur SiCL SiCL SiCL	No Pe		

**Wetland Descriptors** Photo ID(s): #1-2 Sample ID: W4 Flagging Description: #1-15, clockwise from SE corner **Drawing** Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations Obvious Connections to Yes Νo WaterbodyWatershed: Clinch River Waters of the US/State? Primary Water Source Other Cap. Fringe Overbanking Sheet Flow Groundwater Precipitation (If other, note in comments) TVARAM SCORE: TVARAM CATEGORY: Description of Wetland and Other Comments: (i.e. forest age class; habitat features: hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc) Associated with drainage channel/diked. Heavy population of invasives, especially Microstegium; lesser amount of Privet. Connected hydrologically with ASB3/W3.

	V1/W1A	Quantitative Rating	Rater(s): Jimmy G	iroton/Britta Dimick	Date: 10/13/05
2 max 6 pts.	2 subtotal	Metric 1. Wetland		open water body (excluding aqua-	r Blue Ridge and Cumberland Mountains. If an tic beds and seasonal muditats) is >20 acres ha) of it to the wetland size for Metric 1.
		Select one size class and assign	ts) (20.2 ha) (5) [BR/CM (6)] (1 ha) (4) [BR/CM (6)] (ha) (3) [BR/CM (5)] (2 ha) (2) [BR/CM (3)]	Sources/assumptions for Aerial photo Ground survey	size estimate (list):
2 ax 14 pts	14	Metric 2. Upland I		•	
		NARROW. Buffers avera VERY NARROW. Buffers  Intensity of surrounding land VERY LOW. 2nd growth o LOW. Old field (>10 year	m (164 ft) or more around e 25 m to <50 m (82 to <1 ge 10 m to <25 m (32 ft to average <10 m (<32 ft) a verage <10 m (<32 ft) a verage <10 m (<32 ft) a verage <10 m (or double rolder forest, prairie, savas), shrubland, young 2nd sidential, fenced pasture.	d wetland perimeter (7) (64 ft) around wetland perimete (82 ft) around wetland perimeter (0) c check and average. cannah, wildlife area, etc. (7) growth forest (5) park, conservation tillage, new	er (4) ster (1)
27 nax 30 pts	41	Metric 3. Hydrolo	gy		
		3a. Sources of water. Score all this physician physician process of water. Score all this physician process of the precipitation (1) [unless Big Seasonal/intermittent surformation perennial surface water.  3c. Maximum water depth. Sele point of this physician physic	WCM (5)] R/CM primary source (5)] ace water (3) (lake or stream) (5) ct only one and assign sounce.) (2) [BR/CM (3)] M 0.15 to 0.4 m (6 to <16 rologic regime. Score one	Part of wetland/u  1 Part of riparian o  3d. Duration inundation ore. Semi- to permai 3 Regularly inunda  Seasonally inun in.) (2)] Seasonally satu or double check and average.	
		Recovered (7) Recovering (3) Recent or no recovery (1	Check all disturbar ditch tile (including ci dike weir stormwater inpi	☐ point source (no ulvert) ☐ filling/grading ☐ road bed/RR tra ☐ dredging	ack
17.5		Metric 4. Habitat	Alteration and	d Development	
max 20 ρt:	s subtotai	4a. Substrate disturbance. Scot  A None or none apparent (4)  Recovering (2)  Recent or no recovery (4)  Excellent (7)  Very good (6)  Good (5)  Moderately good (4)  Fair (3)  Poor to fair (2)  Poor (1)  4c. Habitat alteration. Score on Recovered (6)  Recovering (3)  Recent or no recovery (6)	e or double check and av	re.	es observed    shrub/sapling removal   herbaceous/aquatic bed removal   woody debris removal
58 subtotal t	8.5	Control to the recovery (	•	selective cutting farming toxic pollutants	sedimentation dredging nutrient enrichment
Last rev	vised 2005-04	29			

Last revised 2005-04-29

Site: W1/W1A	Rater(s):	Jimmy Groton/Britta Dimick	Date: 10/13/05
58.5			
	c 5. Special Wetland	s	
subtotal  10 pts subtotal  11 the doc	cumented raw score for Metric 5 is 30	points or higher, the site is automatically	considered a Category 3 wetland.
Select all document Boo As: Se	that apply. Where multiple values application for each selection (photos, checg, fen, wet prairie (10); acidophilic veg., mo soc. forest (wetl. &/or adj. upland) incl. >0,2 nsitive geologic feature such as spring/seepral pool (5); isolated, perched, or slope we and wetland >0.1 acre (0.04 ha) in reservoir aided channel or floodplain/terrace depressions morph, adapt, in >5 trees >10 in. (25 croological community with global rank (Natural occurrence state/federal threatened/eirose higher rank where mixed rank or qualif perior/enhanced habitat/use; migratory sond	oly in row, score row as single feature with cklists, maps, resource specialist concurre ssy substrate >10 sq.m. sphagnum or other motion of the motion of t	n highest point value. Provide ence, data sources, references, etc). os (5); muck, organic soil layer (3) (45 cm) dbh (5) [exclude pine plantation] fall, rock outcrop/cliff (5) ial or above] (3) scar. etc.) (3) w roots/tip-up. or pneumatophores (3) ank where mixed rank or qualifier] in global rank G1*(10), G2*(5), G3*(3) other fish/wildlife management/designation (3)
	ic 6. Plant Communi	ties, Interspersion, Mic	crotopography
	and vegetation communities.	Vegetation Community Cover Scale 0 = Absent or <0.1 ha (0.25 acre) cor	
A E I Sh I Fo N I Op	I present using 0 to 3 scale.  quatic bed  mergent  rrub  rrest  fludflats  pen water <20 acres (8 ha)  floss/lichen. Other	IFor BR/CM <0.04 ha (0.1 acre)    1 = Present and either comprises a significant management of the properties of moderate quality or comprises a significant management of the properties of moderate quality or comprises as significant management of the properties of moderate quality or comprises as significant management of the properties of the prope	mall part of wetland's vegetation and is of significant part but is of low quality ignificant part of wetland's vegetation and ses a small part and is of high quality ant part or more of wetland's vegetation
Select o	zontal (plan view) interspersion. Inly one. High (5) Moderately high (4) [BR/CM (5)] Moderate (3)[BR/CM (5)] Ioderately low (2) [BR/CM (3)] Low (1) [BR/CM (2)] None (0)	native species  mod = Native species are dominant connomities. Not disturbance tole and species diversity moderate w/o presence of rare, threaten, high = A predominance of native species and predominance of pastive species.	omponent of the vegetation, although erant native species can also be present, et o moderately high, but generally
Add or or	erage of invasive plants. deduct points for coverage. Extensive >75% cover (-5) Moderate 25-75% cover (-3) Sparse 5-25% cover (-1) Nearly absent <5% cover (0) Absent (1)	Mudflat and Open Water Class Qua 0 ≈ Absent <0.1 ha (0.25 acres) [For 1 ≈ Low 0.1 to <1 ha (0.25 to 2.5 acres)] 2 ≈ Moderate 1 to <4 ha (2.5 to 9.9) 3 ≈ High 4 ha (9.9 acres) or more [8]	r BR/CM <0.04 ha (0.1 acre)] res) [BR/CM 0.04 to <0.2 ha acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
Score	crotopography. all present using 0 to 3 scale. Vegetated hummocks/tussocks Coarse woody debris >15 cm (6 in.) Standing dead >25 cm (10 in.) dbh Amphibian breeding pools	None Low Low  Microtopography Cover Scale  0 = Absent	Moderate Moderate High
		<ul> <li>1 = Present in very small amounts</li> <li>2 = Present in moderate amounts, amounts of highest quality</li> <li>3 = Present in moderate or greater</li> </ul>	but not or nignest quality of in strian
[L]	AND TOTAL (max 10		
Refer to the most recent ORAM Score	Calibration Report for the scoring breakpoints bet	ween wetland categories at the following address (3.4).	s est a khare lom us des ved Norborofese_s p <b>e</b> f

Site: W2			Rater(s): Jimmy	Groton	Date: 10/13/05
0	0	Metric 1. Wetland	Area (size)	open water body (exclud	points for Blue Ridge and Cumberland Mountains. If a ling aquatic beds and seasonal mudflats) is >20 acre acre (0.2 ha) of it to the wetland size for Metric 1.
max 6 pts.	sub(oral	Select one size class and assign  >50 acres (>20.2 ha) (6 p  25 to <50 acres (10.1 to <  10 to <25 acres (4 to <10  3 to <10 acres (1.2 to <4  0.3 to <3 acres (0.1 to <1  0.1 to <0.3 acres (0.04 to <0  0 <0.1 acre (0.04 ha) (0)	ts) :20.2 ha) (5) [BR/CM (6) .1 ha) (4) [BR/CM (6)] ha) (3) [BR/CM (5)] .2 ha) (2) [BR/CM (3)]	Sources/assump Aerial photo Ground survey	otions for size estimate (list):
10	10	Metric 2. Upland I	Buffers and S	Surrounding l	Land Use
max 14 pts	subtotal	2a. Calculate average buffer wid  WIDE. Buffers average 50  MEDIUM. Buffers averag  NARROW. Buffers averag  VERY NARROW. Buffers  2b. Intensity of surrounding land  VERY LOW. 2nd growth  LOW. Old field (>10 year  MODERATELY HIGH. Re	m (164 ft) or more arou e 25 m to <50 m (82 to ge 10 m to <25 m (32 ft saverage <10 m (<32 ft use. Select one or doul or older forest, prairie, so, shrubland, young 2n sidential, fenced pasture	nd wetland perimeter (7) <164 ft) around wetland to <82 ft) around wetland around wetland perime ple check and average avannah, wildlife area, e d growth forest (5) park, conservation tilla	) perimeter (4) d perimeter (1) ter (0) etc. (7) age, new fallow field (3)
26	36	Metric 3. Hydrolo	gy		
		3a. Sources of water. Score all   High pH groundwater (5)   Other groundwater (3) [Bl   Precipitation (1) [unless B   Seasonal/intermittent sum   Perennial surface water   3c. Maximum water depth. Sele   >0.7 m (27.6 in.) (3)   0.4 to 0.7 m (16 to 27.6 in.) (4)   0.4 m (<16 in.) (1) [BR/0]     0.4 m (<16 in.) (1) [BR/0]     None or none apparent   Recovered (7)   Recovering (3)   Recent or no recovery (	R/CM (5)]  R/CM primary source (5) face water (3) (lake or stream) (5) ect only one and assign (in.) (2) [BR/CM (3)]  CM 0.15 to 0.4 m (6 to < rologic regime. Score or (12)  Check all disturb	in 100-year in Between in Part of with Part of with Part of with Part of miles in Score.  Semi-type Regula in Season in Season in e or double check and a season in ances observed in point served in culvert) in filling/g	source (nonstormwater) grading jed/RR track ing
15.5		] Metric 4. Habitat	Alteration ar	nd Developm	ent
max 20 p	ts. subtotal	4a. Substrate disturbance. Sco	(1) (1) (1) (1) (2) (3) (4) (5) (6) (7) (8) (9)	average.	ting herbaceous/aquatic bed remoined the country woody debris removal secution dredging

Site: W	2		Rater(s):	Jimmy Gr	oton/Britta	Dimick	Date: 10/1	3/05		
45.	5							· ···		
subtotal previ	ious page									
3 max 10 pts	48.5	Metric 5. Special Wetlands								
3		*If the documented raw score for	If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.							
raw score'		Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).  Bog. fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m. sphagnum or other moss (5); muck, organic soil layer (3)  Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]  Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)  Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland {1st order perennial or above] (3)  Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)  Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)  Gross morph, adapt, in >5 trees >10 in. (25 cm) dbh, buttress, multitrunk/stool, stilled, shallow roots/tip-up, or pneumatophores (3)  Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]  Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3)  [*use higher rank where mixed rank or qualifier] [exclude records which are only 'historic']  Superior/enhanced habitat/use: migratory songbird/waterfowl (5): in-reservoir buttenbush (4), other fish/wildlife management/designation (3)  Cat. 1 (very low quality): <1 acre (0.4 ha) ANO EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)					etc).  ation]  3)			
-1	47.5	Metric 6. Plant Co	mmunit	ties, Int	erspersi	on, Micı	otopogi	aphy		
20 pts.	Subtata	6a. Wetland vegetation communi	ties.	<u>Vegetation</u>	Community C	over Scale				
		Score all present using 0 to 3 sca Aquatic bed	ile.	0 = Absen (For B	t or <0.1 ha (0.; R/CM <0.04 ha	25 acre) contig (0.1 acre)]	uous acre			
		Emergent Shrub		1 = Preser	nt and either co	mprises a sma	Il part of wetlar	nd's vegetation	and is of	
		1 Forest		2 = Preser	<u>ate quality, or c</u> nt and either co	<u>comprises a sic</u> mprises a sign	initicant part builting	<u>it is of low qual</u> retland's veget	ation and	
		☐ Mudflats ☐ Open water <20 acres (8	ha\	is of m	oderate quality	or comprises	a small part an	d is of high qui	ality	
		Moss/lichen. Other	<del></del>		nt and comprise of high quality	es a significant	part or more of	wetland's veg	etation	
		6b. Horizontal (plan view) intersp	ersion.	Narrative E	escription of	Venetation Or	iality			
		Select only one.		low = Low	species diversi	ty &/or domina	nce of nonnativ	e or disturban	ce tolerant	
		High (5) Moderately high (4) [BR/C	:M (5)1		re species ve species are	dominant come	conent of the v	agetation altho	wah	
				noni	e species are dominant component of the vegetation, although ative &/or disturbance tolerant native species can also be present, species diversity moderate to moderately high, but generally					
		☐ Moderately low (2) [BR/CI ☐ Low (1) [BR/CM (2)]	vi (3)]		species diversit presence of rar					
		None (0)		high = A pr	edominance of	native species	with nonnative	sp &/or disturt	ance	
				taler but r	ant native sp at not always, the	bsent or virtual presence of ra	ly absent, and : te_threatened	high sp diversit or endangered	y and often I species	
		6c. Coverage of invasive plants. Add or deduct points for coverage	•							
		-5 Extensive >75% cover (-5)	)		d Open Water t <0.1 ha (0.25			(0.1 acre)]		
		Moderate 25-75% cover ( Sparse 5-25% cover (-1)	-3)		1 to <1 ha (0.2	5 to 2.5 acres)	[BR/CM 0.04 t	o <0.2 ha		
		Nearly absent <5% cover	(0)		0.5 acre)] ate 1 to <4 ha (	2 5 to 9.9 acre	s) [BR/CM 0.2	to <02 ha (0.5	to 5 acre)]	
		Absent (1)			ha (9.9 acres)					
		6d. Microtopography. Score all present using 0 to 3 sc		Hypothetic	al Wetland for	Estimating D	egree of Inter	spersion		
		Vegetated hummocks/tus Coarse woody debris >15						A 15	( F	
		Standing dead >25 cm (10			4.50				( Sec. )	
		1 Amphibian breeding pools		None	Lovi	Low	Moderate	Moderate	High	
					graphy Cover	Scale	<u> </u>			
				<u>0 = Absen</u> 1 = Presei	t in very small	amounts or if r	nore common	of marginal qua	ality	
				2 = Prese	nt in moderate :	amounts, but n	ot of highest qu	uality or in sma	II	
					nts of highest quant in moderate		unts and of hig	hest quality		
<u> </u>		1								
47	7.5	GRAND TOTAL (r	nax 100	pts)						
Refer to the r	most recent OF	IAM Score Calibration Report for the scoring t	reakpoints betwee	n wetland categor	ies at the following s	address / Up inside	ಕಲ್ಪೂ ಕರ್ಮಕ್ಕಿಂಗ ಚಿಕ್ಕಗಳು	, 431.431 mm		

TVA-00026294

Site: W3			Rater(s): Jimmy Groton/B	Date: 10/13/05	
3	3 subtotal	Metric 1. Wetland	Area (SIZe) open water	body (excluding aquati-	Blue Ridge and Cumberland Mountains. If an c beds and seasonal mudflats) is >20 acres a) of it to the wetland size for Metric 1.
		Select one size class and assign >50 acres (>20.2 ha) (6 p 25 to <50 acres (10.1 to < 10 to <25 acres (4 to <10 3 3 to <10 acres (1.2 to <4 h 0.3 to <3 acres (0.1 to <1 0.1 to <0.3 acre (0.04 to <<0.1 acre (0.04 ha) (0)	score. ts) (20.2 ha) (5) [BR/CM (6)] (1 ha) (4) [BR/CM (6)] (a) (3) [BR/CM (5)] (2 ha) (2) [BR/CM (3)]	rces/assumptions for	
12 max 14 pts.	15	Metric 2. Upland	Buffers and Surrou	nding Land	Use
		NIDE. Buffers average 50 MEDIUM. Buffers average NARROW. Buffers average VERY NARROW. Buffer Distribution of surrounding land VERY LOW. 2nd growth of the surrounding land LOW. Old field (>10 year MODERATELY HIGH. Re	Ith. Select only one and assign score m (164 ft) or more around wetland the 25 m to <50 m (82 to <164 ft) arouge 10 m to <25 m (32 ft to <82 ft) arouge 10 m to <25 m (32 ft to <82 ft) around wetland	perimeter (7) und wetland perimete round wetland perimet tland perimeter (0) nd average. dlife area, etc. (7) rest (5) servation tillage, new	r (4) ter (1)
20	35	Metric 3. Hydrolo	gy		•
		3e. Modifications to natural hyd None or none apparent Recovered (7) Recovering (3) Recent or no recovery (	BR/CM (5)] BR/CM primary source (5)] Inface water (3) Ilake or stream) (5) 30 ect only one and assign score.  in.) (2) [BR/CM (3)] /CM 0.15 to 0.4 m (6 to <16 in.) (2)] Infologic regime. Score one or double (12)  Check all disturbances obseived in the control of the control o	Part of wetland/u Part of riparian or Duration inundation Semi- to perman Regularly inunda Seasonally inun Seasonally satue check and average.  Proved point source (not filling/grading road bed/RR tra dredging other_reserve	ulake and other human use (1) pland (e.g., forest), complex (1) r upland corridor (1) ulsaturation. Score one or dbl. check & avg. nently inundated/saturated (4) ted/saturated (3) [BR/CM (4)] uldated (2) [BR/CM (4)] urated in upper 30 cm (12 in.) (1) [BR/CM (2) constormwater) ack
14	49	Metric 4. Habitat	Alteration and Dev	elopment	
max 20 pts	subtotal	None or none apparent Recovered (3) Recovering (2) Recent or no recovery 4b Habitat development. Sele Excellent (7) Very good (6) Good (5) Moderately good (4) Fair (3) Poor to fair (2)	(1) cot only one and assign score. one or double check and average.	e. Check all disturbanc	tes observed Shrub/sapling removal herbaceous/aquatic bed removal

Site: W3		Rater(s): Jimmy Groton/Britta Dimick	Date: 10/13/05
49 Subtotal previous page			
3 52 max 10 pts. subtotal	Metric 5. Special \	Vetlands	
3	"If the documented raw score for	Metric 5 is 30 points or higher, the site is automatically	considered a Category 3 wetland
raw score*	Select all that apply. Where multi documentation for each selection Bog, fen, wet prairie (10); acid Assoc, forest (wetl. &/or adj. u Sensitive geologic feature suc Vernal pool (5); isolated, perc Island wetland >0.1 acre (0.04 Braided channel or floodptain Gross morph, adapt, in >5 tre Ecological community with glo Known occurrence state/feder ("use higher rank where mixing Superior/enhanced habitat/use	ole values apply in row, score row as single feature with (photos, checklists, maps, resource specialist concurre ophilic veg., mossy substrate >10 sq.m, sphagnum or other more pland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in h as spring/seep, sink, losing/underground stream, cave, watered, or slope wetland (4); headwater wetland (1st order perenn ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5) terrace depressions (floodplain pool, slough, oxbow, meander as >10 in. (25 cm) dbh; buttress, multitrunk/stool, stilted, shallowed all rank (NatureServe); G1*(10), G2*(5), G3*(3) (*use higher rait threatened/endangered species (10); other rare species with drank or qualifier] (exclude records which are only "historic") migratory songbird/waterfowl (5); in-reservoir buttonbush (4); ore (0.4 ha) AND EITHER >80% cover of invasives OR nonvegore.	n highest point value. Provide ence, data sources, references, etc). oss (5); muck, organic soil layer (3) (45 cm) dbn (5) [exclude pine plantation] rfall, rock outcrop/cliff (5) ial or above) (3) scar, etc.) (3) w roots/tip-up, or pneumatophores (3) ank where mixed rank of qualifier] in global rank G1*(10), G2*(5), G3*(3) other fish/wildlife management/designation (3).
9 61	Metric 6. Plant Co	mmunities, Interspersion, Mic	crotopography
	6a. Wetland vegetation communi Score all present using 0 to 3 sca	ies. Vegetation Community Cover Scale le. 0 = Absent or <0.1 ha (0.25 acre) con	tiquous acre
	Aquatic bed Emergent	[For BR/CM < 0.04 ha (0.1 acre)]	
	1) Shrub	moderate quality or comprises a s	nall part of wetland's vegetation and is of significant part but is of low quality
	ସି Forest ୗ Mudflats	2 = Present and either comprises a sign moderate quality, or comprise	gnificant part of wetland's vegetation and es a small part and is of high quality
	Open water <20 acres (8 h     Moss/lichen, Other	a) 3 = Present and comprises a significa and is of high quality	nt part or more of wetland's vegetation
	6b. Horizontal (plan view) intersp Select only one.  High (5)  Moderately high (4) [BR/C]  Moderate (3)[BR/CM (5)]  Moderately low (2) [BR/Ci Low (1) [BR/CM (2)]  None (0)	Iow = Low species diversity &/or dominative species  M (5)] mod = Native species are dominant connonnative &/or disturbance toler and species diversity moderate w/o presence of rare, threatened high = A predominance of native species tolerant native splasent or virtuative sp	nance of nonnative or disturbance tolerant mponent of the vegetation, although rant native species can also be present, to moderately high, but generally dor endangered species es with nonnative sp &/or disturbance ually absent, and high sp diversity and ofter
	6c. Coverage of invasive plants.		rate, threatened, or endangered species
	Add or deduct points for coverag  Extensive >75% cover (-5	0 = Absent < 0.1 ha (0.25 acres) [For B	ty 3R/CM <0.04 ha (0.1 acre))
		3) 1 = Low 0.1 to <1 ha (0.25 to 2.5 acre (0.1 to 0.5 acre))	
	Nearly absent <5% cover Absent (1)		cres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)] //CM 2 ha (5 acres) or more]
	6d Microtopography. Score all present using 0 to 3 sc Vegetated hummocks/tus  [] Coarse woody debris >15 of	socks	Degree of Interspersion
	Standing dead >25 cm (1)  Amphibian breeding pools		Moderate Moderate High
		Microtopography Cover Scale  0 = Absent	
		<ul> <li>1 = Present in very small amounts or</li> <li>2 = Present in moderate amounts, but amounts of highest quality</li> </ul>	t not of highest quality or in small
	ล	3 = Present in moderate or greater an	noburs and or industri drains
61	GRAND TOTAL (r	nax 100 pts)	
later to the most recent O	RAM Score Calibration Report for the scoring t	reakpoints between wettand categories at the following address (mic., w.,	www.eou.state.co.us. asw 401,421,505
ast revised 2005-04-		-	

Site: W4	Quantitative Rating	Rater(s): Jimmy Groton	/Kim Pilarski	Date: 10/17/05
3 3	Metric 1. Wetland	Area (SIZE) open wa	ter body (excluding aguat	r Blue Ridge and Cumberland Mountains. If an itie beds and seasonal mudflats) is >20 acres ha) of it to the wetland size for Metric 1.
max 6 pts. subtotal	Select one size class and assign  >50 acres (>20.2 ha) (6 p  25 to <50 acres (10.1 to <  10 to <25 acres (4 to <10  3 to <10 acres (1.2 to <4 h  0.3 to <3 acres (0.1 to <1  0.1 to <0.3 acre (0.04 to <0.1 acres (0.04 to <0.1 acres (0.04 ha) (0)	score. (s) 20.2 ha) (5) [BR/CM (6)] 1 ha) (4) [BR/CM (6)] a) (3) [BR/CM (5)] 2 ha) (2) [BR/CM (3)]	ources/assumptions for	
10 13	Metric 2. Upland	Buffers and Surro	unding Land	Use
max 14 pts subtotal	MIDE. Buffers average 50 MEDIUM. Buffers average NARROW. Buffers average VERY NARROW. Buffers 2b. Intensity of surrounding land VERY LOW. 2nd growth LOW. Old field (>10 years MODERATELY HIGH. R	th. Select only one and assign so m (164 ft) or more around wetlar e 25 m to <50 m (82 to <164 ft) a ge 10 m to <25 m (32 ft to <82 ft) a average <10 m (<32 ft) around v use. Select one or double check or older forest, prairie, savannah, ), shrubland, young 2nd growth foesidential, fenced pasture, park, oen pasture, row cropping, mining	d perimeter (7) round wetland perimete around wetland perimete vetland perimeter (0) and average. wildlife area, etc. (7) prest (5) conservation tillage, ne	er (4) eter (1)
18 31	Metric 3. Hydrolo	gy		
mäx 30 ρι <del>s</del> subtotal	3 Seasonal/intermittent sur Perennial surface water 3c. Maximum water depth. Sele >0.7 m (27.6 in.) (3) 0.4 to 0.7 m (16 to 27.6 i) <0.4 m (<16 in.) (1) [BR/	R/CM (5)]  R/CM primary source (5)]  face water (3)  (lake or stream) (5)  ct only one and assign score.  in.) (2) [BR/CM (3)]  CM 0.15 to 0.4 m (6 to <16 in.) (2)  rologic regime. Score one or dou	Part of wetland Part of riparian of 3d. Duration inundatio Semi- to perma Regularly inund Seasonally inund	ain (1) /lake and other human use (1) /upland (e.g., forest), complex (1) or upland corridor (1) n/saturation. Score one or dbl. check & avg. nently inundated/saturated (4) dated/saturated (3) [BR/CM (4)] dated (2) [BR/CM (4)] urated in upper 30 cm (12 in.) (1) [BR/CM (2)
	7 Recovered (7) Recovering (3) Recent or no recovery (	Check all disturbances ob	served     point source (r     filling/grading     road bed/RR to     dredging     otherreserv	rack
10   41	☐ Metric 4. Habitat	Alteration and De	velopment	
max 20 pts subtotal	4a. Substrate disturbance. Sco None or none apparent Recovered (3) Recovering (2) Recent or no recovery 4b. Habitat development. Sele Excellent (7) Very good (6) Good (5) Moderately good (4) Fair (3) Poor to fair (2)	re one or double check and average.  (4)  (1)  ct only one and assign score.		shrub/sapling removal herbaceous/aquatic bed removal woody debris removal
suciolal tris page  Last revised 2005-	04.29			

Site: W4	Rater(s): Jimmy Groton/Kim Pilarski	Date: 10/17/05					
subtotal previous page							
3 44 Metric 5. Specia	l Wetlands						
3 *If the documented raw score	*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.						
Select all that apply. Where modocumentation for each select Bog, fen, wet prairie (10); Assoc forest (wetl. &/or a Sensitive geologic feature Vernal pool (5); isolated, pland wetland >0.1 acre (Braided channel or floodp Gross morph, adapt, in >5 Ecological community with Known occurrence state/figuse higher rank where Superior/enhanced habitaty	Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).  Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m., sphagnum or other moss (5); muck, organic soil layer (3)  Assoc, forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]  Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)  Vernal pool (5); isolated, perched, or slope wetland (4), headwater wetland [1st order perennial or above] (3)  Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)  Braided channel or floodplain/terrace depressions (floodplain pool, subpw., meander scar, etc.) (3)  Gross morph, adapt, in >5 trees >10 in. (25 cm) dbh; buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)  Ecological community with global rank (NatureServe); G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]  Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3)  [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]  Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)  Cat. 1 (very low quality): <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)						
	ommunities, Interspersion, M						
6a. Wetland vegetation comm Score all present using 0 to 3 Aquatic bed Emergent Shrub 1 Forest Mudflats Open water <20 acres Moss/lichen. Other	unities.  Vegetation Community Cover Scal  Scale.  0 = Absent or <0.1 ha (0.25 acre) co  [For BR/CM <0.04 ha (0.1 acre)]  1 = Present and either comprises a  moderate quality, or comprises a  is of moderate quality, or comprise	eontiquous acre					
6b. Horizontal (plan view) inte Select only one.  High (5)  Moderately high (4) [Bi Moderate (3)[BR/CM (5)]  Moderately low (2) [BR 1] Low (1) [BR/CM (2)]  None (0)	Narrative Description of Vegetation low = Low species diversity &/or don native species  CCM (5)] mod = Native species are dominant of nonnative &/or disturbance tole CCM (3)] and species diversity moderate w/o presence of rare, threaten high = A predominance of native species	component of the vegetation, although erant native species can also be present, et o moderately high, but generally					
6c. Coverage of invasive plant Add or deduct points for cover  Sextensive >75% cover Moderate 25-75% cover Sparse 5-25% cover (- Nearly absent <5% cov Absent (1)	but not always, the presence consider of the presence of the p	of rate, threatened, or endangered species elity r BR/CM <0.04 ha (0.1 acre)] res) [BR/CM 0.04 to <0.2 ha acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]					
6d. Microtopography.  Score all present using 0 to 3  Vegetated hummocks/t  Coarse woody debris > 1  Standing dead >25 cm Amphibian breeding po	Hypothetical Wetland for Estimatin scale. Ussocks 5 cm (6 in.) (10 in.) dbh ols  None  Low  Microtopography Cover Scale  0 = Absent  1 = Present in very small amounts of 2 = Present in moderate amounts, b amounts of highest quality	g Degree of Interspersion  Moderate Moderate High  r if more common of marginal quality ut not of highest quality or in small					
42 GRAND TOTAL	3 = Present in moderate or greater a	amounts and of highest quality					

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories at the following address: http://www.edu.state.ch/scisso/401.401.ntml

# DROWNING CREEK MITIGATION PROJECT PROPOSAL

#### CUMBERLAND COUNTY TENNESSEE

February 2007

Prepared for:

Tennessee Valley Authority Environmental Affairs, LP 5D-C Chattanooga, Tennessee

Tennessee Department of Environment and Conservation Division of Water Pollution Control Nashville, Tennessee

Prepared by:

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# **BACKGROUND**

The mitigation site is located adjacent to Joe Tabor Road in Cumberland County, Tennessee; site coordinates are W85.07825, N36.04028 (Figure 1). The project site was surveyed on February 15, 2007 and was found to be approximately 27 acres in size with approximately 19.5 acres being suitable for wetland mitigation activities. The Hydrogeomorphic (HGM) classification for this wetland site is Riverine.

The site, which is in the floodplain of Drowning Creek, historically was forested but has been cleared and converted to pasture (Figure 2). Portions of the site are drained by rim ditches that intercept overland flow from uplands, and by internal ditches that convey floodwaters to the creek. The majority of the site (approximately 19.5 acres) is degraded wetland, although small inclusions of upland habitat do occur. These upland areas likely were the natural levees and ridges that were formed as the creek meandered back and forth across its floodplain and deposited material during flood events. Such upland features are natural and integral components of most riverine systems.

The objective of this proposal is to detail how alterations to the hydrology and plant community will be reversed such that (given sufficient time) the site will have the characteristics and functions of forested riverine wetlands in this portion of the State. The ultimate goal of the project is to restore and enhance site quality to the point that it will be suitable for the Tennessee Valley Authority to use as mitigation for unavoidable wetland impacts at the Kingston Steam Plant in adjacent Roane County.

The following site description is based on an evaluation conducted by Ken Morgan and Tom Roberts (MRW Properties). Regulatory agency personnel who have visited the site include Mike Lee with the Tennessee Department of Environment and Conservation (TDEC) and Ruben Hernandez with the Nashville District of the U. S. Army Corps of Engineers (USACE).

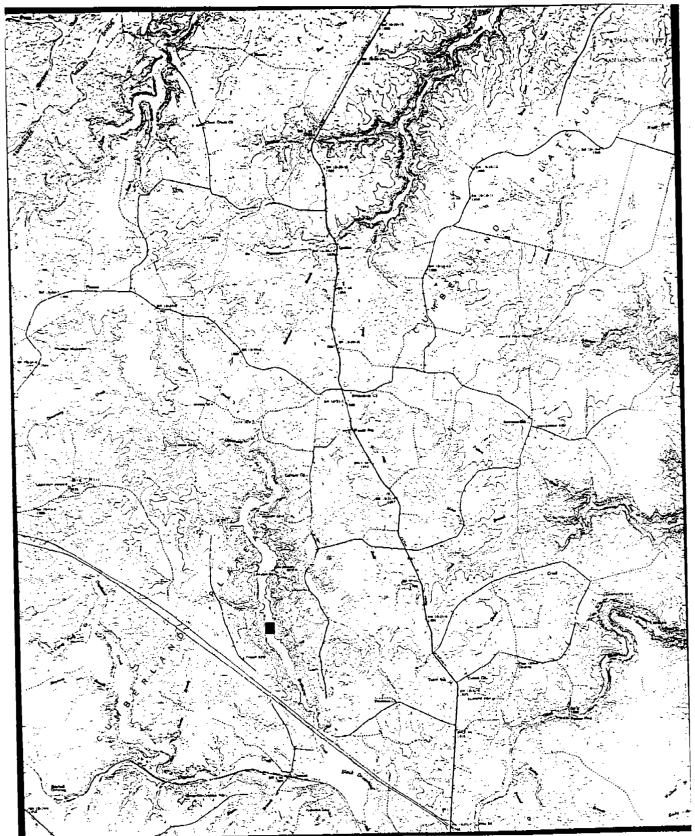


Figure 1. Approximate location of site northeast of Crossville, TN on the Isoline Quadrangle marked in red.

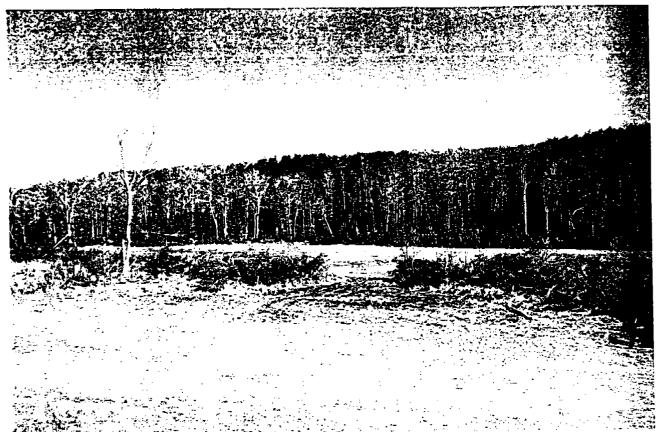


Figure 2. View of site showing grazed pasture. Excavated and ditched areas are indicated by taller vegetation in the center of the photo.

#### VEGETATION

The entire site currently is dominated by herbaceous species including tall fescue (Festuca arundinacea) in higher areas, with soft rush (Juncus effusus), fox sedge (Carex vulpiniodia), and other species tolerant of soil saturation in areas where the water table is near the surface (Figure 3). Cattail (Typha latifolia) and woolgrass (Scirpus cyperinus) are found in several areas that had been excavated to create watering areas for livestock (Figure 4). Giant cane (Arundinaria sp.), panic grass (Paricum sp.), goldenrods (Solidago spp.), blackberry (Rubus spp.), and other weedy species occur in a marrow strip between the pasture and Drowning Creek (Figure 5).

The dominant vegetation community in unaltered riverine wetlands in central and eastern

Tennessee (Burns and Honkala 1990) is forest with the overstory composed primarily of willow oak

(Quereus phellos), water oak (Q. nigra), white oak (Q. alba), cherrybark oak (Q. pagodacto...), green ash

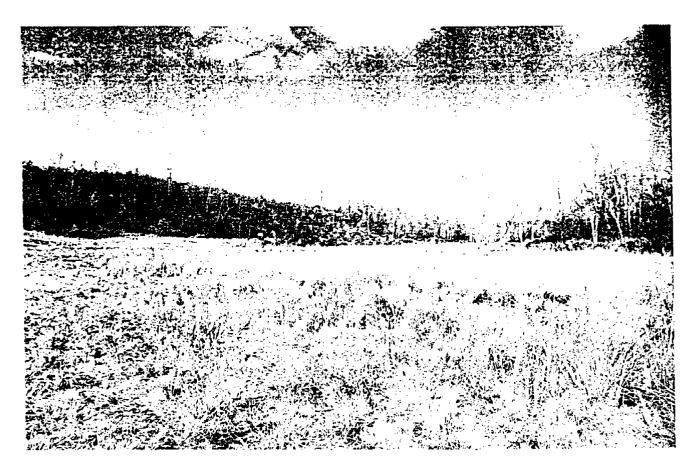


Figure 3. View of site showing grazed pasture dominated by fescue and various species of sedges and rushes.

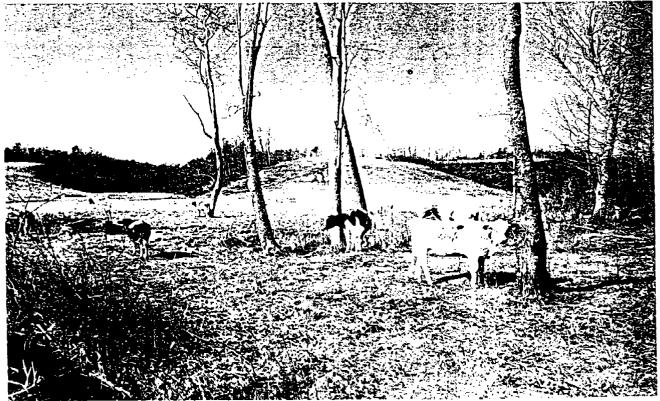


Figure 4. View of site showing excavated watering areas being used by livestock.



Figure 5. View of site showing strip of vegetation between pasture and Drowning Creek.

(Fraxinus pennsylvanica), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), and hackberry (Celtis occidentalis). Common understory species include various dogwoods (Cornus spp.), ironwood (Carpinus caroliniana), and possumhaw (Viburnum nudum). Numerous other species can occur depending on individual site conditions and disturbance history. Given the current condition of the proposed mitigation site, the plant community clearly is different and significantly degraded relative to reference wetlands within the region.

#### SOILS

The only soil series mapped at the site is Atkins, described taxonomically as a Fluvaquentic Endoaquept. Field examination of the soil agreed with the following description from the National Cooperative Soils Survey (<a href="https://www.newsasslage.com/www.newsassl

inches (Bg2 horizon), a gray brown (2.5YR 5/2) loam. Redoximorphic features occur in all four horizons. Atkins is a very deep, poorly drained floodplain soil that formed in acid alluvium washed from uplands. It is nearly level, but includes concave or linear features; slopes range from 0 to 3 percent. Surface water runoff from Atkins is negligible and permeability is classified as slow to moderate (0.06 to 2.0 inches /hour) in the subsoil. The series does not possess a fragipan and the water table that may be near the surface from winter until early summer is described as apparent. Atkins is on the national list of hydric soils and also on the list for Cumberland County

Atkins soils are not well suited to row crops or even pasture without artificial drainage, but many areas in central and eastern Tennessee have been converted to such uses. Pastures generally are of poor quality. Regardless of the intended land use, drainage is necessary to lower the groundwater level to a depth that will allow plants not adapted to saturated conditions to survive and grow. In addition to the online soil survey, *Wet Soils of Tennessee* (Talley and Monteith 1994) was a source of information on the characteristics of the Atkins series.

#### HYDROLOGY

The hydrology of the site has been altered by a series of ditches that were excavated to facilitate the production of livestock forage. Along the western boundary of the site, a rim ditch that runs approximately North – South (Figure 6) intercepts runoff that would flow across the site from the adjacent uplands and channels it to Drowning Creek. Other ditches (Figure 7) have been dug in the internal portions of the site for the purpose of removing surface water following rainfall events. Ditches and drainage tiles can be somewhat effective in lowering groundwater levels in soils such as Atkins as subsurface water flows laterally toward them. Whereas deep ditches can lower the groundwater table for a considerable distance, those at the proposed mitigation site are quite shallow and have not had a significant effect of groundwater hydrology. Based on wetland indicator status of the dominant plants and field observations of the water table, almost all the site that historically had been wetland apparently has retained sufficient hydrology to



Figure 6. View of rim ditch that runs across most of the site, eventually conveying surface water into Drowning Creek.



Figure 7. View of interior ditches that convey floodwater to Drowning Creek

still be categorized as jurisdicational wetland. Only portions of the site that naturally are slightly higher in elevation and narrow areas within the zone of influence of the ditches would not be classified as wetland.

The hydrology of unaltered riverine wetlands with Atkins soils that are adjacent to moderate-sized creeks and streams in central and eastern Tennessee is characterized by a combination of overbank flooding and a water table that is near the surface well into the growing season. Although overbank flooding does occur, especially during winter and early spring, flood durations are brief and flooding is not the primary source of hydrology driving the creation and maintenance of the wetlands. The Atkins series is described as having an apparent high water table from the surface to 1 foot below the surface during winter and spring. Depressions in portions of some sites may pond water well into the growing season. The series is listed in *Hydric Soils of the United States* as being hydric due to Criteria 2b3 (a high water table).

Given the current condition of the proposed mitigation site, it is clear that the hydrologic regime there has been degraded relative to reference wetlands within the region. The ditch system is effective in removing surface water from overbank events and flood duration likely is substantially shorter than that which would occur in unaltered systems. However, unlike many similar areas that have been effectively drained with a series of deep ditches or underground tiles, groundwater levels at this site remain near the surface and still exert an influence on the soils and plant community.

#### PROPOSED ENHANCEMENT

The modifications to the hydrology, the removal of the native forest community, and the continuous intensive grazing by livestock have resulted in significant, but reversible, degradation. Because two of the site's fundamental characteristics (landscape position and soils) have not been altered and while a third chacteristic (hydrology) has been altered but not removed, the site is an excellent candidate for enhancement activities. Once the following plan is implemented, there is a high probability of success and given time for the plant community to develop, the site will support a productive, high quality riverine

wetland. Such wetlands are not common in central and eastern Tennessee, thus the proposed mitigation site will be a valuable addition to the State's wetland base.

#### VEGETATION

The approximately 19.5 acres of degraded wetland acreage will be planted with native tree species that occur in riverine wetlands of the area. Although the site is relatively level, it maintains its normal microtopographical variability (due to stream processes and tree "tip-ups"). Planting locations for each species thus will be determined by relative elevations of the site and the individual species tolerance to saturation and inundation. Species include willow oak, cherrybark oak, white oak, green ash, persimmon (*Diospyros virginiana*), and others recommended by local regulatory personnel. If available, one or more of the water-tolerant dogwoods (*Cornus* spp.), ironwood, and possumhaw will be planted as understory species based on availability.

Overcup oak (*Q. lyrata*) which is known to occur in portions of central Tennessee, will be planted in the lowest portions of the site if approved by the regulatory agencies. Willow oak, green ash, dogwood, and ironwood will be planted at intermediate elevations. Higher portions of the site will be planted primarily with white oak, cherrybark oak, and persimmon. Trees will be planted on ten-foot centers along sinuous rows at a density of 450/acre. No one species will comprise more than 40% of the trees planted. Species such as sweetgum and red maple likely will volunteer and become established on their own. Once mature, this suite of planted and volunteer tree species will provide an abundance of food and cover for a variety of wildlife including mammals, birds, reptiles, and amphibians characteristic of riverine wetlands in the area. Additionally, during the early and intermediate stages of succession, the area will be a highly diverse plant community that supports specialized species that depend on seral habitats. Examples include the common yellowthroat (*Geothlypis trichas*) and yellow warbler (*Dendroica petechia*).

#### **HYDROLOGY**

To enhance the hydrology of the site and return it to pre-alteration conditions, the ditches on the site will be filled. This will prevent the drainage of surface water and will restore groundwater hydrology

in a narrow zone immediately near the ditches. Care will be taken not to damage the remaining trees that have been left standing. In areas with little microtopography, ditches will be blocked, not filled to create small pools for the purpose of enhancing on-site diversity and providing additional breeding habitat for amphibians. These activities will result in a total of 19.5 acres of enhancement credit, a sufficient amount to offset losses at TVA's Kingston steam plant.

# PROPOSED MONITORING

Monitoring of the mitigation site will aid in determining if it is returning to pre-alteration conditions. Collection of this data will be used to determine if the project can be considered a success, or if mid-course modifications are warranted. Monitoring of the site will take place annually for a five-year period. Details of the monitoring program are described in the sections below.

# HYDROLOGY AND SOILS

Once work on the ditches has been completed, 3 shallow groundwater wells will be installed in the northern, central, and southern portions of the site. Monitoring of the 3 wells will take place periodically from early March to early June in order to determine if the hydroperiod of the site has returned to that consistent with an unaltered Atkins soil. Presence and depth of ponding in the micro-depressions will be noted. Soil from areas judged to be characteristic of the site will be described; information from the upper 18 inches of the soil profile that will be recorded includes texture, Munsell color, and types and abundance of redoximorphic features present.

#### VEGETATION

Monitoring the survival of planted trees throughout the site will be conducted in fall. Percent survival of planted trees will be determined by walking rows and tallying trees as either living or dead. In addition to survival data, the overall composition of the plant community will be determined by visual estimates of the dominant species. Data collected will include total percent cover, percent cover by species, and species richness.

#### WILDLIFE

Utilization of the site by wildlife will be documented during site visits conducted to monitor hydrology and sample vegetation. Monitoring of wildlife will include direct observations and aural verification, as well as evidence of presence such as tracks, hair, nests, and eggs. A list of wildlife species will then be produced for each monitoring period.

# PHOTOGRAPHIC DOCUMENTATION

Photographs of the mitigation site will be taken from numerous points established prior to the first monitoring event. Each point will be marked by driving a PVC pipe into the ground; GPS coordinates of each location will be recorded. Photographs will be taken at these points during every monitoring event to provide a record of the changes that take place as the plant community matures.

#### MONITORING REPORTS

Monitoring reports will enable the regulatory agencies to determine if the proposed mitigation is successful based on pre-determined performance standards. Reports will include locations of transects and photographic points, monitoring protocol, and results and evaluation of data collected. Specifically data on hydrology, vegetation, and soils will be evaluated to determine if the criteria for being considered jurisdictional wetland as described in the 1987 Wetland Delineation Manual (U. S. Army Corps of Engineers 1987) are met.

#### PERFORMANCE STANDARDS/CRITERIA

The success or failure of the mitigation efforts ultimately will be determined by the hydroperiod, vegetation structure and composition, and soil conditions that develop at the site following the restoration and enhancement actions proposed. The following performance standards/criteria will be used to make that determination.

1. The site should develop and maintain a hydroperiod that is consistent with a Atkins soil by the end of the five-year monitoring period.

- 2. Species in the FAC, FACW, or OBL categories should cover no less than 70% of the site by the end of the second-year monitoring period.
- 3. Survival of planted trees at the site will be no less than 70% at the end of each monitoring period.

If any of these standards are not met, corrective measures will be taken and monitoring will continue on an annual basis until they are met. At the end of the monitoring period, a deed restriction as outlined by TDEC will be placed on the property to ensure its long-term protection.

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