



Prospectus

Wolf River Mitigation Bank II



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IMPORTANT DEFINITIONS¹

Mitigation bank means a site, or suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by DA or other state or local permits, for impacts to regulated waters.

Compensatory mitigation means the *restoration* (re-establishment or rehabilitation), *establishment* (creation), *enhancement*, and/or in certain circumstances *preservation* of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Restoration means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: *reestablishment and rehabilitation*.

Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Establishment (creation) means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Preservation means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Functions means the physical, chemical, and biological processes that occur in ecosystems.

Buffer means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses.

¹ See Compensatory Mitigation for Losses of Aquatic Resources: Final Rule dated April 10, 2008 [Section 332.2].

Riparian areas are lands adjacent to streams, rivers, lakes, and estuarine marine shorelines. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality.

EXECUTIVE SUMMARY

Land & Natural Resources Consultants, on behalf of Wolf River Mitigation Bank II, LLC, submits this Prospectus and Mitigating Banking Instrument to the Memphis District - U.S. Army Corps of Engineers and Interagency Review Team (IRT) to initiate evaluation of the proposed Wolf River Mitigation Bank II (Bank II) in accordance with 33 CFR 332.8(d)(2).

The proposed Bank II will be a commercial wetland mitigation bank providing credits for sale to public and private permittees that receive a Section 404 from the U.S. Army Corps of Engineers and Section 401 certification from the Tennessee Department of Environment and Conservation. The site, which encompasses approximately 666 +/- acres, is located along the Shaws Creek tributary of the Wolf River in Fayette County; just north of the City of Piperton and northeast of the City of Collierville, Tennessee (see Figure 1). As shown in Figure 2, Wolf River Bank II would provide mitigation for unavoidable impacts to wetlands within the Wolf River Watershed (HUC 08010210) which includes Fayette, Hardeman, and Shelby Counties and the Nonconnah Creek Watershed (HUC 08010211) in Shelby and Fayette County, Tennessee. Both watersheds have numerous channel sections and tributaries listed pursuant to Section 303(d) of the Clean Water Act as not meeting water quality standards protective of fish and aquatic life uses (loss of biological integrity) due to siltation and physical substrate and habitat alterations². The proposed bank site will result in improving the quality and quantity of aquatic resources and, therefore, is consistent with the *Watershed Approach* for selection of compensatory mitigation sites³.

As shown in Figure 3, the site adjoins Wolf River Conservancy property to the south, Wolf River Bank I and Tennessee Wildlife Resources Agency property to the west. The site is a 666+/- acre tract proposed for restoration, enhancement and preservation of bottomland hardwood wetlands.

The Bank II site offers significant opportunities for generating compensatory mitigation credit including 1) restoration of bottomland hardwood wetland habitat on prior converted wetland acreage; 2) increasing/enhancing wildlife habitat adjacent to the Shaws Creek; 3) preservation of several hundred acres swamp tupelo/bottomland hardwood forest adjacent to over 1,500 acres of lands under conservation management within the Wolf River watershed (a river system which has been determined to be of both state and national ecological and recreational significance).

The Bank II property is currently owned by Raleigh LaGrange, G.P. and consists primarily of agricultural fields (farmed under contract) and bottomland hardwood forests lying within the 100-year floodplain of the Wolf River and Shaws Creek. The agricultural fields are prior converted croplands (PC) which have been farmed since prior to the Civil War. Past agricultural practices employed ditches and channelization of Shaws Creek tributaries to drain these fields.

² Tennessee Department of Environment and Conservation. August, 2010. Proposed Final Version YEAR 2010 303(d). http://www.tn.gov/environment/wpc/publications/pdf/2010proposed_final_303dlist.pdf

³ See 33 CFR 332.3(c) *Watershed approach* means an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed.

Analysis of historical hydrology and ten years of experience with Wolf River Mitigation Bank I indicates that sufficient surface runoff is available for capture by the construction of simple water control structures (drainage plugs) to meet hydrologic restoration goals. Planting mast-producing hardwoods (400 trees per acre) will further ensure restoration of a bottomland hardwood forest on this site. Hydrology will be monitored using a series of RDS WL-40 monitoring wells located across the site, which will record groundwater elevation readings on a daily basis. A reference site with two RDS WL-40 wells will be established within the existing bottomland hardwood wetlands along Shaws Creek downstream of the Bank II and will be used to aide in the valuation of the success of wetland hydrology restoration. Wetland vegetation and tree survival will be evaluated annually with contingency plans should hydrology or vegetation fail to meet the success criteria. Long-term stewardship of the Bank II will be provided by placement of restrictive covenants (no timbering or resource development allowed) and transfer of fee simple ownership to an approved conservation program or state conservation agency upon completion of mitigation monitoring and full credit release by the Interagency Review Team (IRT) Chair.

Wolf River Bank II would generate 217 credits (see Figure 8. Bank Development Plan) - 124 credits derived from restoration [re-establishment] of bottomland hardwood forest on 124 acres of PC acreage lying within the annual floodplain; 21 credits derived from establishment of bottomland hardwood wetlands on 21 acres of mapped hydric soil lying along the edge of the 100-yr floodplain; 11 credits for establishment of adjacent forested upland buffers on 44 acres of agricultural fields; 47.6 credits for enhancement and preservation of 238 acres adjacent uplands and 130 credits from preservation of 130 acres of adjacent bottomland hardwood forest⁴. All 666 +/- acres would be subjected to restrictive covenants which prohibits commercial timber harvesting and resource development) and transferred fee simple to an approved conservation program or state conservation agency. More specifically, the goal of the placement of 666 +/- acres under a restrictive covenant, which specifically prohibits commercial timber harvesting and natural resource development, is to allow for the eventual development of an old growth bottomland hardwood forest of ecologically significance size. This action, over the long term, will result in increased ecological diversity and function beyond that of conservation easements which allow sustainable timber harvesting. Transferring ownership of the 666 +/- acres of private property to a state agency will significantly extend public access/use to the adjoining 1,500 acres currently under state ownership; resulting in a continuous tract of over 2,500 publicly owned acres within the Wolf River corridor.

In summary, the proposed site is ecologically suitable for restoration of bottomland hardwood wetlands based on its historical land use (prior converted croplands), its landscape position (adjacency to large tracts of lands under conservation), soils, hydrology, vegetation, and current land use. Further, the restoration of bottomland hardwood wetlands, the elimination of agricultural and timber harvesting practices on hundred acres within an active floodplain will not only reduce siltation and flooding potential but provide significant benefits to the watershed's ecological function and services. Finally, not only is the large size of the site ecologically significant within itself (larger than over 80% of mitigation banks nationwide) but permanently protects an exceptional Tennessee water, contributes significantly to the conservation needs in the Wolf River/Nonconnah Creek service area, and benefits existing mitigation projects (adjacent to the closed Wolf River Mitigation Bank).

⁴ Removal of timbering rights, allowing public access, the size and location of the property within an ecologically significant watershed and transfer of property ownership provides the basis for preservation credit.

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1.0 INTRODUCTION

1.1 PURPOSE AND NEED

The purpose of this Mitigation Banking Instrument is to establish guidelines and responsibilities for the establishment, use, operation and maintenance of the Bank. The Bank plans to sell credits commercially for compensatory mitigation for impacts to waters [wetlands] of the United States which result from activities authorized under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899, provided such use has met all applicable requirements and is authorized by the appropriate authority. In the 2008 Final Rule regarding Compensatory Mitigation for Losses of Aquatic Resources issued by the U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency (EPA), the use of mitigation banks was given the highest priority among all mitigation options.

Additionally, the rules of the Tennessee Water Quality Control Board require compensatory mitigation for unavoidable impacts to wetlands through their Aquatic Resource Alteration permit and federal Clean Water Act Section 401 certification programs. The Bank will also sell credits to satisfy these state requirements.

1.2 MEMORANDUM OF UNDERSTANDING

This Mitigation Banking Instrument (MBI) will serve as a Memorandum of Understanding regarding the establishment, use, operation, and maintenance of the Wolf River Mitigation Bank II (the Bank). This Memorandum of Understanding is made and entered into, by, and among Wolf River Mitigation Bank II, LLC (Sponsor) and the members of the Interagency Review Team (IRT). The members of the IRT include the Memphis District of the Corps, the U.S. Environmental Protection Agency Region 4 (EPA), the U.S. Fish and Wildlife Service (FWS), the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the Tennessee Valley Authority (TVA), the Tennessee Department of Environment & Conservation (TDEC) and the Tennessee Wildlife Resources Agency (TWRA).

1.3 ESTABLISHMENT AND USE OF CREDITS

In accordance with the provisions of this Mitigation Banking Instrument and upon satisfaction of the performance standards, a total of 217 wetland credits will be available to be used as compensatory mitigation for impacts to waters of the U.S, in accordance with all applicable requirements. Credits will be sold to third parties at an appropriate market rate to be determined by the Sponsor.

1.4 AUTHORITIES

The establishment, use, operation, and maintenance of Mitigation Banks are carried out in accordance with the following authorities:

1.4.1 FEDERAL

- Clean Water Act (33 USC 1251 et seq.)
- Rivers and Harbors Act (33 USC 403)
- Compensatory Mitigation for Losses of Aquatic Resources issued by the Corps and the EPA; Final Rule (April 10, 2008)
- Regulatory Programs of the Corps of Engineers, Final Rule (33 CFR Parts 320-330)
- Guidelines for Specification of Disposal Sites for Dredged and Fill Material (40 CFR Part 230)
- Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army concerning the Determination of Mitigation Under the Clean Water Act, Section 404 (b)(1) Guidelines (February 6, 1990)
- Federal Guidance for the Establishment, Use, Operation of Mitigation Banks (60 F.R. 58605 et seq.)
- Section 26a of the Tennessee Valley Authority Act
- Fish and Wildlife Coordination Act (16 USC 661 et seq.)

1.4.2 STATE

- The Tennessee Water Quality Control Act of 1977, T.C.A. §69-3-2.
- Rules of Tennessee Department of Environment and Conservation Water Quality Control Board. Chapter 1200-4-7 Aquatic Resource Alteration.

1.5 ACTIONS UNDER MULTIPLE AUTHORITIES

Per 33 CFR 332.3(j)(1)(ii), proposed restoration activities may address requirements of multiple regulatory programs and authorities for the same activity.

2.0 WATERSHED SELECTION

The Sponsor has used a watershed selection process as part of the siting of this Bank in order to maintain and improve the quality and quantity of aquatic resources within the Bank's geographical service area. Through the establishment and use of this mitigation bank the Sponsor proposes to provide a wide variety of landscape, resource and habitat types to create, enhance, restore and protect aquatic resource functions at strategic locations within the geographical service area.

The Wolf River corridor contains some of the best natural bottomland hardwood forests and riparian habitat remaining in west Tennessee. The river originates in Mississippi, nearly 100 miles east of Memphis, and flows through portions of Hardeman, Fayette, and Shelby Counties before emptying into the Mississippi River on the north side of Memphis. The Wolf River Corridor contains extant populations of plant and animal species considered rare, threatened, or endangered including: southern twayblade (*Listera australis*), capillary hairsedge (*Bulbostylis ciliatifolia* var. *coarctatus*), shining ladies' tresses (*Spiranthes lucida*), red iris (*Iris fulva* var. *leitheira*), copper iris (*Iris fulva*), southern rein-orchid

(*Platanthera flava* var. *flava*), river otter (*Lutra canadensis*), great blue heron (*Ardea herodias*), grasshopper sparrow (*Ammodramus savannarum*), northern madtom (*Noturus stigmosus*), naked sand darter (*Ammonocrypta beani*), blue sucker (*Cycleptus elongatus*), and blossom mussel (*Epioblasma turgidula turgid*).

As shown in Figure 2, the Wolf River Watershed, Hydrologic Unit Code (HUC) 08010210, is located in Mississippi and southwestern Tennessee. The Wolf River Watershed includes parts of Fayette, Hardeman, and Shelby counties in Tennessee. The watershed lies within three Level III ecoregions (Southeastern Plains, Mississippi Alluvial Plain, and Mississippi Valley Loess Plains) and contains three Level IV subcoregions. The Tennessee portion of the Wolf River Watershed has approximately 1,026 miles of streams and drains approximately 569 square miles to the Mississippi River. The designated use classifications for the Wolf River include fish & aquatic life, industrial water supply, irrigation, livestock watering & wildlife, navigation, and recreation.

The Tennessee portion of the Nonconnah Creek Watershed (HUC 08010211) includes parts of Fayette and Shelby counties in southwestern Tennessee as shown in Figure 2. The watershed lies within two Level III ecoregions (Mississippi Alluvial Plain and Mississippi Valley Loess Plains) and contains three Level IV subcoregions. The Nonconnah Creek Watershed has approximately 261 miles of streams and drains approximately 277 square miles into the Mississippi River. The designated use classifications for Nonconnah Creek include fish and aquatic life, irrigation, livestock watering and wildlife, and recreation.

The proposed Bank site lies along Shaws Creek, a tributary to the Wolf River located in a reach of the river above Collierville, Tennessee. The entire length of Shaws Creek is listed as an *Exceptional Tennessee Water*⁵ based on the presence of extant populations of the Copper Iris, a listed species. The Wolf River watershed supports populations of 23 threatened and endangered species and has been identified by the Tennessee Division of Forestry as one of fourteen *Forest Legacy Areas* in Tennessee and is ranked as one of the four highest priorities in the Legacy program. Additionally, the Tennessee Department of Environment and Conservation rates the Wolf as “statewide and regionally significant” for its natural and scenic qualities as well as fully supporting of all designated uses. Further, the Memphis District Corps of Engineers has determined that unaltered ecosystems of the type associated with the Wolf River hardwood bottom land forests are nationally significant.

Management needs pertinent to the Bank that were identified for the Wolf River watershed include improvement of water quality to support native aquatic organisms and protect and improve riparian and aquatic habitat by reducing erosion and sediment in streams and increasing forested corridors. The Bank

⁵ Tennessee water quality standards require the incorporation of the antidegradation policy into regulatory decisions (Chapter 1200-4-3-.06). Part of the responsibility the policy places on the Division of Water Pollution Control is identification of exceptional Tennessee Waters (previously known as Tier 2) and Outstanding National Resource Waters (Tier 3). In exceptional waters, degradation cannot be authorized unless (1) there is no reasonable alternative to the proposed activity that would render it non-degrading and (2) the activity is in the economic or social interest of the public. In Outstanding National Resource Waters, no new discharges, expansions of existing discharges, or mixing zones will be permitted unless such activity will not result in measurable degradation of the water quality.

would help accomplish these goals by establishing riparian corridors adjacent to Shaws Creek, and their on-site tributaries, improving aquatic habitat and reducing erosion by keeping soil in place, and help improve water quality by reducing sediment and agricultural chemicals from entering the stream.

The proposed geographical service area is the Tennessee portions of the Wolf River and Nonconnah Creek drainage basins (Figure 2). The location and nature of the Bank are ideal for providing wetland mitigation opportunities for a wide variety of project types, such as, commercial or residential development, public roads or other infrastructure, or other public uses.

3.0 SITE SELECTION

The Bank property was selected by the Sponsor for several reasons. First and foremost, the site contains a large number of acres of prior converted croplands (PC) which lie adjacent to bottom land hardwood wetlands within in the Wolf River floodplain. The property's location along Shaws Creek will create important benefits for the watershed as agricultural runoff will be filtered as it flows across the Bank property. Additionally, the wetlands would also store flood waters and provide substantial wildlife benefits.

Secondly, Raleigh LaGrange, G.P., owns the property in question, including the mineral rights, and is willing to sell the property for purposes of developing a wetland mitigation bank. The site has favorable topography and lies within the city limits of the City of Piperton. This area is under pressure from continued growth due to construction of an adjacent interstate highway and railway system and proximity to the city of Memphis.

Finally, in 2001, the Sponsor successfully developed a 794 +/- acre wetland mitigation bank adjacent to the site, i.e., the initial Wolf River Wetland Mitigation Bank [Bank I], which generated 139 proven credits. All credits generated by Bank I have been released and sold. The proposed Bank II would add an additional 666 acres; providing connectivity to over 1,500 acres of lands under state ownership or conservation easements.

4.0 OBJECTIVES

The Bank Sponsor's objective is to develop the proposed 666 +/- acre tract into a landscape scale mosaic of bottomland hardwood wetland types interspersed with uplands and adjacent to the existing 769 +/- acres Wolf River Mitigation Bank I. Specifically our objectives include the generation of wetland mitigation credits through restoration of 124 acres of PC fields, establishment of wetlands on 21 acres of agricultural fields with hydric soils characteristics, establishment of 44 acres of adjacent upland buffers, enhancement of 238 acres of fallow land; providing connectivity between wetlands and preservation of 130 acres of outstanding stands of adjacent bottomland hardwood wetlands.

The ecological value of this project will be the sum of all the interrelated parts or habitats and their cumulative services. As described in Section 5.2.2 and shown in Figure 8, the development plan is designed to enhance ecological value and derive a mitigation credit value based on the entire project area. The Bank will ultimately become part of the relatively unfragmented bottomland forest corridor along the Wolf River, which is comprised of other protected tracts owned by the State of Tennessee, The Nature Conservancy (TNC), Wolf River Conservancy, and private individuals.

5.0 ESTABLISHMENT AND BANK OPERATION

5.1 ESTABLISHMENT OF THE BANK

5.1.1 *WORKPLAN*

5.1.1.1 Hydrology Restoration

The existing croplands were carved out of bottomland forests many decades ago. Over the years, the hydrologic regimes of these fields were altered to assure that the land would support agricultural activities. The channel and flow of Shaws Creek was altered to allow access and to keep floodwaters off the farmland in many areas. Numerous existing drainage-ways were channelized and new ones created to facilitate the rapid drainage of the croplands. A few of the wettest areas were left as forest and they remain so today.

Due to the large scale historic alteration of drainage patterns, an integral part of the hydrologic restoration for this project will be the construction of substantial plugs at strategic points along the ditches and drainage-ways in the areas targeted for restoration (see Figures 6 and 7). The forested streams and ditches in these areas will remain in their present contours. Those ditches within and adjacent to restoration area will be plugged and contoured as shallow swales so that they will not drain the associated restored bottomland forests but will retain their wetness for more of the year. This provides for additional landscape diversity within the restored bottomland forest.

The soil surface of PC acreage will be broken up by rough plowing or disking. This will assure that water falling on it from precipitation, or diverted onto it, will be trapped and remain for a longer period of time resulting in saturated soils for a much longer period during the year. In order to restore the contours of the fields so that they will once again possess wetland hydrology and vegetation, a series of terraces and earthen berms will be utilized. At present, the exact areas targeted for terracing and berm construction have not been identified. Future site visits will determine the precise locations and the strategy to be utilized in this undertaking. These activities will serve to improve the ecological conditions of the site, and provide viable, sustainable, ecological, and hydrological functions that will achieve mitigation success.

5.1.1.2 Vegetation Restoration

The wetland restoration will be comprised of plantings of native tree species identified within the natural community types within and adjacent to the Bank. The goal is to restore these areas to natural bottomland

hardwood plant communities through proper site preparation, planting, and periodic maintenance. Following the protocol established for the original bank MOA, approximately 361 bottomland hardwood forest trees per acre will be planted within the fields, which are now in cropland, along contours and in sinuous rows. These trees will be mixed randomly by species and planted on an average of 3.75 m centers in areas with non-hydric soils and 3.2 m in areas with hydric soils. Specifically these species include: overcup oak (*Quercus lyrata*) (OBL) [planted in wettest areas only], water oak (*Quercus nigra*) (FAC), pin oak (*Quercus palustris*) (FACW), cherry bark oak (*Quercus falcata* var. *pagodifolia*) (FAC). No one species will comprise over 40% of the hard mast plantings. Additional trees, shrubs, and groundcover species will volunteer and fill in between the planted trees. The natural recruitment will come from existing seed banks and from natural dispersal mechanisms unique to each species. This type of establishment is an inherent part of natural succession and given ideal hydrological conditions, the types of native wetland plant species sought will become established through these natural processes.

5.1.2 MAINTENANCE PLAN

The on-site mitigation may require regular maintenance. Maintenance and management activities may include, but are not limited to maintenance, repair, and replacement of WLRs and MEIs, exotic or noxious species removal, and replanting. Upon completion of the seventh year of monitoring, the ACOE and TDEC will assess the status of the proposed restoration and enhancement activities in regard to the overall success criteria as outlined above. If a determination is made that the mitigation areas meet the intent of these criteria, the sponsor will ask that they approve the termination of monitoring requirements.

5.1.3 PERFORMANCE STANDARDS

The following criteria, in addition to the general performance standards used by the Corps, will be used to assess project success. If any of the following performance standards are based on meeting the hydrophytic vegetation, hydric soils, or wetland hydrology criteria in the 1987 U.S. Army Corps Wetlands Delineation Manual, then achieving the criteria for the applicable regional supplement will also be acceptable as proof that the Bank is meeting its performance standards.

5.1.3.1 Wetland Hydrology

All areas proposed for wetland restoration or establishment must show evidence of wetland hydrology. The attainment of wetland hydrology will be determined by the presence of sufficient indicators to satisfy the wetland hydrology criteria included in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual across the vast majority of permanent sampling points for a continuous period of not less than 5% of the growing season (14 days based on the May, 2012 Eastern Mountains and Piedmont, Version 2.0 regional supplement to the 1987 Manual) for a number of years to be determined appropriate by the Corps, in consultation with the IRT. Reference sites, i.e., monitoring stations within existing adjacent wetlands, will be employed to compare the degree, duration, and periodicity of flooding of reference sites with that of the restoration and establishment sites. Hydrology will be considered comparable if the restoration and establishment sites are within 15% of the reference site hydrology.

5.1.3.2 Vegetation

All areas proposed for wetland restoration and establishment must meet the required hydrophytic vegetation criteria in the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and 2010 Regional Supplement. Specifically, at least 51% of the relative vegetative cover in wetland areas will be of species that are Facultative, Facultative Wetland or Obligate Wetland. All wetland and upland areas on the Bank site will have at least a 75% absolute vegetative cover, except in areas of near-constant inundation that cannot support such a high absolute vegetative cover percentage.

The success of the proposed plantings within the restoration or establishment areas will be based on the survivorship of the planted trees in these areas and natural recruitment of target species. At least 300 target tree species per acre (including naturally colonizing species) shall be hard mast producing species which have been established on-site for five consecutive successful years after construction is complete. The planting activities will be deemed successful when, at the end of seven years, survivorship of the planted trees is 75% or greater. If areas do not meet any requirements related to survival rate or vegetative cover, appropriate planting and/or seeding activities will be initiated.

5.1.3.3 Hydric Soils

All areas proposed for wetland restoration or establishment must show evidence of hydric soils by meeting the criteria described in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. Evidence of wetland hydrology will be sufficient to show that the hydric soils criterion is being met as it may take many years before certain indicators of hydric soils develop.

5.1.3.4 Proven Credits

Before the final credits can be released, the presence of hydric soils, wetland hydrology, and hydrophytic plants will be demonstrable for the large majority of sampling data taken during the course of the monitoring of the project. It will be the decision of the Corps, in consultation with the IRT, to determine that areas proposed for wetland restoration or establishment shall have met all three criteria described in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual with sufficient regularity to prove the presence of wetland conditions across all areas intended for wetland development. Upland areas will be determined to be successful based on percent cover of the intended vegetation and the relative absence of invasive species, as described below.

5.1.4 MONITORING PLAN

The Sponsor agrees to perform all necessary work to monitor the Bank to demonstrate compliance with the performance standards established in this Mitigation Banking Instrument.

Two of the three wetland parameters (hydrology and vegetation) will be monitored at the Bank for a period of at least seven years. Hydrologic monitoring will occur at the permanent sampling plots from April through June at a frequency sufficient to show the presence of wetland hydrology for at least 14 consecutive days at the vast majority of sampling plots. This sampling will occur for at least the first three years after the site grading and excavation is complete. After the first three years, the frequency of hydrologic monitoring may be reduced to monitoring twice a year at the discretion of the Corps, in consultation with the IRT. The site will be monitored for invasive species and animal damage during

these visits. Since the methods used to determine the presence or absence of wetland hydrology in the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual are the definitive standard, they will be used to monitor the Bank's hydrology to determine if wetland hydrology has been established as a result of restoration activities. The methods described in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual provide a snapshot view of wetland conditions at one moment in time, but by accessing data taken repeatedly, this monitoring method will provide information on wetland conditions along a timeline, specifically the frequency and duration of wetland hydrology.

Vegetation will be surveyed yearly, or more often at the discretion of the Sponsor, in order to determine if vegetative performance standards are being met. The methods used shall match those described in Section E of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual regarding Comprehensive Determinations and 2010 Regional Supplement. Woody vegetation shall be sampled within a thirty foot radius from the center of the sampling plot. Vegetation will be identified and wetland indicator status will be determined.

The monitoring protocol will be implemented to track and document the expected progression of changes in the restoration and preservation areas in the proposed Bank. The data to be collected will consist of hydrologic and vegetation attributes collected along transects oriented perpendicular to the undulation of the landscape and existing ditches. The combined data obtained from the measurements and observations of these attributes will provide the basis for interpretation of the success of these mitigation efforts. Monitoring of the Bank will be conducted over a minimum period of seven years to document the patterns of hydrologic change, the vitality and growth of the planted trees, and the recruitment of desirable shrub and groundcover species. The primary components of the proposed monitoring plan are described below.

5.1.4.1 Hydrologic Monitoring

Permanently referenced hydrologic monitoring stations will be placed along the transects in strategic locations at approximately 400 to 600 feet throughout the proposed restoration area in a pattern that is representative of the aerial extent of the site, existing land use patterns, and topographic contour. The exact spacing will be determined in the field in order to sufficiently capture the variations in site conditions. All wells will be located by survey or Global Positioning System (GPS) and elevations established. Seven solid state ground and surface water level recorders (WLRs) will be permanently installed along transects within representative portions of the restoration site. The purpose of these instruments is to record daily water levels to determine and document the existing hydroperiods. A total of 15 maximum event water level indicators (MEs) will also be permanently installed along the transects. The purpose of these instruments is to record the maximum ground and surface water elevation reached in the monitoring wells during the monitoring interval.

The initial phase of hydrologic monitoring will document the baseline (existing) hydroperiod conditions in various parts of the site. The WLRs and the MEs will be installed prior to initiation of the ditch-plugging program. The daily WLR recordings (measurements every twelve hours) will be downloaded quarterly and data from the MEs will be collected biannually (the first week of March and first week of May). Data will be presented in tabular and graphic format in the baseline and annual reports. Secondary wetland hydrology indicators will be noted during each site visit and reported in the annual monitoring report.

5.1.4.2 Vegetation Monitoring

Annual quantitative monitoring events will be conducted throughout the proposed restoration areas to collect data relative to the growth and vitality of planted trees, and the recruitment of desirable canopy, shrub, and herbaceous species; and to document changes in the existing vegetation or the plant community that becomes established following mitigation activities. The vegetation monitoring station (VMS) monitoring will consist of the establishment of permanently marked fixed area sampling quadrats. Seventeen VMSs will be located randomly throughout the targeted restoration areas. Standard methods (i.e., Kent and Coker, 1992) will be used to quantitatively assess and describe vegetation within these plots. Planted vegetation and/or existing trees greater than one meter (3.3 feet) tall will be assessed from within larger plots (i.e., 100 square meters, 0.1 acre, etc.) with herbaceous vegetation, including seedlings and saplings less than one meter tall, to be assessed from within one square meter plots lying in the northwest and southeast corners of each larger plot (36 total herbaceous plots).

All vegetation shall be keyed to species with its wetland indicator status noted. A comprehensive list will be included in monitoring reports. Monitoring will occur once a year in late April or early May in order to capture seasonal herbaceous vegetation occurring during conditions of maximum soil saturation.

These stations will be located along and adjacent to transects established for hydrological monitoring. The data collected from these areas will be compared to data regarding preexisting wetland conditions to determine whether any changes in the conditions of the wetland creation and enhancement areas are due to natural events (such as drought or heavy rains), or due to attempts at hydrology restoration.

Routine wetland forms per the 1987 Federal Wetlands Delineation Manual (WDM) will be used at each plot to report applicable criteria (i.e., dominance of wetland indicator species).

5.1.4.3 Reports

The Sponsor shall submit to the Corps, for distribution to the other members of the IRT, an annual monitoring report in accordance with Regulatory Guidance Letter 06-3 (Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Creation, Restoration, and/or Enhancement of Aquatic Resources). This monitoring report will be submitted not later than November 1st.

Information will include:

- WLR hydrologic data as tabulated summaries and hydrographs.
- MEI hydrologic data as table of high water levels.
- Tabulated data summaries of wetland vegetation sampling.
- Photographic documentation of the wetland restoration and enhancement areas.
- Interpretation assessment and evaluation of results and narrative discussion of site conditions regarding wetland restoration and enhancement success and upland restoration success.

- Local precipitation measurement from appropriate available sources.
- Any significant storm events resulting in high water discharge in the Wolf River that could affect the bank site.
- Applicable data from routine wetland forms per the 1987 Wetlands Delineation Manual.
- Any activities undertaken to address deficiencies or improvements in previously implemented hydraulic site modifications.

The monitoring reports will be submitted to the Department of the Army, Corps of Engineers (ACOE) and Tennessee Department of Environment and Conservation (TDEC) staff within 60 days of each annual monitoring event for review and distribution to signatory IRT members.

5.2 BANK OPERATION

5.2.1 *USE OF THE BANK*

As established by the original MOA, compensatory mitigation must comply with § 404 of the CWA as well as the Tennessee Water Quality Act. In order to comply with the compensatory mitigation requirements as provided by Rule 1200-4-7 (Tennessee Aquatic Resource Alterations), any approved project that occurs within the service of the Bank shall be mitigated at a minimum 2:1 ratio. Acres impacted will be rounded up to the nearest 0.10 acre. The applicant must then purchase two credits from the Bank for every acre impacted in the service area (2:1 ratio). Projects submitted and approved from outside the service area shall be mitigated at a minimum ratio of 4:1 or at a ratio to be determined in the discretion of the responsible regulatory agencies and negotiated between the permit applicant and the responsible regulatory agencies.

5.2.2 *DETERMINATION OF BANK CREDITS*

The Bank Development Plan, as shown in Figure 8 would provide 217 credits through restoration of PC fields, establishment of wetlands on agricultural fields with hydric soils, establishment of adjacent upland buffers, enhancement of fallow land; providing connectivity between wetlands and preservation of adjacent outstanding stands of bottomland hardwood wetlands. The following summarizes the proposed credit generation by activity, i.e., restoration, establishment, enhancement and preservation.

Restoration of 124 acres of PC in fields 15 (7 acres), 19 (106 acres) and 23 (11 acres) to bottomland hardwood wetlands. **Credit generation 1:1 = 124 credits**

Functional Gain

Restoration actions will result in conversation of prior converted crop land back to bottomland hardwood wetlands. Wetland functions including flood flow alteration and sediment, toxicant, and nutrient removal will result from the increase in wetland area. Restoring forested conditions will further benefit functions associated with erosion control by stabilizing soil in the floodplain and increasing transpiration rates at the site, thus decreasing stormwater runoff. Establishing trees on the site will benefit the production, storage and export of organic matter. Organic carbon supplied by leaves, branches, animals and insects

that originate from the riparian forest is an important part of the food chain that will further enhance habitat for fish and aquatic macro-invertebrates.

Establishment of 21 acres of bottomland hardwood wetlands on soils with hydric characters [falaya soils] in field 15 (converting soybean field to bottomland hardwood wetland). **Credit generation 1:1 = 21 credits**

Functional Gain

Establishment actions will result in conversation of crop land back to bottomland hardwood wetlands on Falaya soils which were not field mapped as PC but are generally listed as having hydric characteristics in Fayette County. Wetland functions including flood flow alteration and sediment, toxicant, and nutrient removal will result from the increase in wetland area. Restoring forested conditions will further benefit functions associated with erosion control by stabilizing soil in the floodplain and increasing transpiration rates at the site, thus decreasing stormwater runoff. Establishing trees on the site will benefit the production, storage and export of organic matter. Organic carbon supplied by leaves, branches, animals and insects that originate from the riparian forest is an important part of the food chain that will further enhance habitat for fish and aquatic macro-invertebrates.

Establishment of 44 acres of adjacent forested upland buffers in field 19 (converting soybean field to upland hardwood forest). **Credit generation 0.25:1 = 11 credits.**

Functional Gain

Upland buffer plantings will provide food and cover for wildlife, reduce sedimentation of wetlands, and provide an area of dense planting that may provide a barrier to invasive plant species. Plantings of mast bearing trees will accelerate the development of a mature native forest and deter the influx of invasive plant species from nearby sources. This will improve habitat value by increasing species and structural diversity of the plant community, which are beneficial attributes of wildlife habitat; increasing habitat structure and providing habitat connectivity, food and cover for wildlife, and a source of organic nutrients associated with leaf litter.

While establishment of adjacent upland buffers serves a critical functional role in enhancing and protecting wetlands, adjacent uplands do not function as wetlands and do not replace wetland functions. Therefore they do not warrant the same level of credit as wetland restoration or enhancement. Because the proposed buffer is large, provides connectivity and will eliminates future development [property is zoned residential and is within the City limits] we propose credit be allowed 0.25:1.

Enhancement of restored and established wetlands through reforestation of 238 acres of fallow uplands between fields 15 and 19 providing connectivity (removal of invasive plants and planting of hardwoods). **Credit generation 0.20:1 = 47.6 credits**

Functional Gain

Enhancement by reforestation and removal of invasive plants will increase habitat structure and provide habitat connectivity, food and cover for wildlife, and a source of organic nutrients associated with leaf litter. Organic matter from riparian vegetation is an important source of energy to the Shaws Creek food

chain. Establishing mast producing trees on the site will have a significant benefit to the production, storage, and export of organic matter, which is important to several downstream processes, and is critical for forest dependent wildlife species, such as neo-tropical migratory birds, which have declined due to habitat fragmentation and loss of forested areas.

While enhancement of upland buffers serve a functional role by enhancing and protecting wetlands, adjacent uplands do not function as wetlands and do not replace wetland functions. Therefore they do not warrant the same level of credit as wetland restoration or enhancement. Because the proposed buffer is large, provides connectivity and will eliminates future development [property is zoned residential and is within the City limits] we propose credit be allowed 0.20:1.

Preservation credits would be generated by placement of restrictive covenants and fee transfer of 130 acres of high quality bottomland hardwood wetlands. This track contains outstanding stands of tupelo gum and other harvestable bottomland hardwoods. We propose to place the property under restrictive covenants that prohibits timber harvesting, development of mineral rights and allows public access/use. Further, we propose to transfer fee simple ownership of the property to a state agency. The proposed credit for preservation meets the requirements set forth in 33 CFR 332.3(H) and, as documented in the following sections, the site permanently protects an exceptional water, contributes significantly to the conservation needs in the Wolf River/Nonconnah Creek service area, and benefits existing mitigation projects (adjacent to the closed Wolf River Mitigation Bank). **Credit generation 0.10:1 = 13.0 credits**

5.2.3 CREDIT RELEASE SCHEDULE

Released Credits shall be tied to milestones and performance measures. Mitigation activities, other than preservation, shall be subject to the following mitigation credit release schedule:

- 15% mitigation credit release after receipt of the signed and recorded conservation easement or other approved long term site protection instrument and an approved 404 authorization.
- 5% additional mitigation credit release (20% cumulative) upon written acceptance from the Corps of the "As Built" Report.
- 60% credit release divided equally (80% cumulative) over the monitoring period upon documentation that Performance Standards are being met.
- 20% additional mitigation credit release (100 % cumulative) upon proof that final Performance Standards are met. Final credit release is contingent upon final accounting of mitigation credits and written release from compliance monitoring from the Corps in consultation with the IRT.

Preservation Credit Release

100% of the mitigation credits allowed for preservation will be released upon the following:

- Approval of the project mitigation plan.
- Filing of Restrictive Covenant(s), or other necessary legal protection and fee transfer of the property to a state agency.

5.2.4 BANK ACCOUNTING PROCEDURES

The Sponsor will maintain a credit ledger report for the Bank showing the beginning and ending balance of available credits and permitted impacts for each resource type, all additions and subtractions of credits, and any other changes in credit availability, such as additional credits released or credit sales suspended. The credit ledger report will be submitted to the Corps on an annual basis after the first of each calendar year. The Corps will distribute copies of this ledger to the other IRT members. Additionally, the Sponsor shall submit a written statement to the Corps for each approved credit transaction. The credit ledger report will be kept as a part of the administrative record for the Bank and can be made available to the public by the Corps upon request.

5.2.5 *FINANCIAL ASSURANCES*

The Sponsor agrees to provide the following financial assurances for the work described in this Mitigation Banking Instrument. The Sponsor shall provide the sum of \$40,000 U.S. Dollars⁶ as a Letter of Credit from a financial institution that is a member of the Federal Insurance Deposit Corporation. These funds shall be termed Contingency Funds and shall be payable on demand by the Corps in the event that the Sponsor fails to comply with the terms of this Banking Agreement or to rectify any unforeseen events as determined by the Corps, in consultation with the IRT. The Letter of Credit will state that the Corps will receive notification of at least 120 calendar days in advance of any termination or revocation of said letter. The Sponsor will submit an annual statement regarding the state of the financial assurance funding to the Corps along with the annual credit ledger report.

6.0 SERVICE AREA

As established by the original MOA, the Bank Sponsor shall be entitled to service impacts under the terms and conditions of this proposal which occur in the Wolf River Watershed, in Fayette and Shelby Counties and that portion of Hardeman County that is located in the Wolf River Watershed (Figure 2). In Bank, impacts occurring in the Nonconnah Creek watershed in Shelby County are also included. Any and all wetland types occurring in western Tennessee or the service area may be compensated for from the Bank pending approval by the IRT.

7.0 NEED AND TECHNICAL FEASIBILITY FOR THE BANK

Based on experience with our initial Wolf River Mitigation Bank, demand for wetland credits in the service area is relatively high; as demonstrated by the sale of all 139 credits generated from the development of Wolf River Bank I. Need is driven by the residential, commercial and industrial growth in the area; and by construction of new interstate highways, existing railways (container shipping and intermodal facilities) and the centralized air transport facilities of Federal Express. This growth coupled

⁶ Dollar amount subject to change based on the final approved Bank Development Plan.

with the fact that growth areas often result in unavoidable impacts to wetlands which are common within the Mississippi alluvial and Gulf Coastal plains. Following the sale all credits from our Wolf River Mitigation Bank I, there are currently no wetland bank credits available within the proposed service area. Wolf River Mitigation Bank II is located adjacent to the initial bank; thus demonstrating the technical feasibility and credit generation capacity of the proposed Bank II.

8.0 OWNERSHIP AND LONGTERM MANAGEMENT

Following Bank II closure, the ownership and long term management of the Bank II property will be responsibility of the state agency accepting the fee simple transfer of property ownership. During the period of Bank II operation the management of Bank II property will be the responsibility of the bank Sponsor.

8.1 ADAPTIVE MANAGEMENT

If the site cannot be constructed in accordance with the Final Bank Development Plan (Figure 8), the Sponsor will notify the Corps. Any significant modifications in the Bank Development Plan must be approved by the Corps. After initial site construction, the Sponsor shall maintain the property using an adaptive management approach that will provide flexibility when dealing with unforeseen issues. The Sponsor shall implement all facets of site maintenance in perpetuity. The Sponsor, Breedlove Dennis & Associates and Land & Natural Resources Consultants have extensive experience with successional plant assemblages and the Bank site will be planted with an initial planting assemblage that contains species that are adapted to early successional conditions as well as plentiful sunlight in addition to young mast hardwood plantings that will eventually be the dominant species. The Sponsor is prepared to remove softwood species if necessary if they become overly prevalent as appropriate for the long-term management of the site.

Additionally, if site monitoring and maintenance activities determine that the project as planned is unable to meet the ecological performance standards, then the Sponsor will consult with the Corps and the IRT for suggestions of design changes, site modifications, or revisions to monitoring or maintenance requirements in order to ensure that the Bank provides aquatic resource benefits similar to the objectives described. If necessary, the ecological performance standards may need to be revised to address deficiencies in the compensatory mitigation project or in management strategies or objectives if the new standards provide for ecological benefits that are comparable or superior to the approved compensatory mitigation project. No other revisions to performance standards will be allowed except in the case of natural disasters.

9.0 QUALIFICATIONS OF THE SPONSOR

Services related to project planning and design as well as construction oversight and monitoring of the Bank will be contracted to the scientists Land & Natural Resources Consultants and Breedlove Dennis & Associates. Land & Natural Resources Consultants has offices in Memphis, Tennessee. Breedlove

Dennis & Associates is located in Winter Park, Florida. Both firms have significant experience with compensatory mitigation projects throughout the southeastern United States; including the design, construction oversight and monitoring of the initial Wolf River Mitigation Bank. A complete overview of each firm's experience is available at the following websites – Mitigation-solutions.com and BDA-Inc.com.

10.0 ECOLOGICAL SUITABILITY

10.1 LANDSCAPE POSITION

10.1.1 BANK SITE HAS HIGH RESTORATION VALUE

The proposed Bank II is approximately 666 acres and is contiguous with the sold out and closed 764 acre Wolf River Mitigation tract. Within the proposed Bank II, the Natural Resources Conservation Service has determined that 124 acres represent “prior converted cropland” (PC), i.e., land which has been physically altered such that it no longer features important wetland services⁷. One hundred six (106) acres of PC are contained within one 160 acre field, i.e., field 19. Additionally, the fields are adjacent to Shaws Creek, a tributary of the Wolf River. Shaws Creek is currently identified as impaired on the 2004 303(d) listing due to organic enrichment/low dissolved oxygen.⁸ We propose to restore the site by removing the land from agricultural service and restoring the PC acres to bottomland hardwood wetlands. This should also provide significant water quality enhancement for Shaws Creek. As the IRT is aware, restoration (defined as “the re-establishment or rehabilitation of a wetland or other aquatic resource with the goal of returning natural or historic functions and characteristics to a former or degraded wetland”⁹), is the preferred method for establishment of any compensatory mitigation site, especially for wetland mitigation bank sites. Further, restoration of a previously degraded or impacted wetland (with emphasis on prior converted areas) is the most favored form of compensatory mitigation for wetland impacts by the Rules of the Tennessee Water Quality Control Board.¹⁰

⁷ November 28, 1995 wetland determination by Richard Cody, District Conservationist, Natural Resources Conservation Service. Validation confirmed by Richard Cody on October 16, 2002 by letter to Richard Young of BDY, Inc. The fields in question have been farmed by Gary Jameson for the past 35 years. Mr. Jameson estimates the fields had been farmed for 75 years prior to his farming operations.

⁸ Tennessee Department of Environment and Conservation. Proposed 2004 303(d) Listing. http://www.state.tn.us/environment/wpc/publications/2004_303dlist.pdf

⁹ Methods of Compensatory Mitigation. Environmental Protection Agency. 24 Dec. 2002. Retrieved June 12, 2004 from www.epa.gov/owow/wetlands/facts/CMitigation.pdf. 20

¹⁰ Rule 1200-4-7-.04(7)(b). “. Mitigation for impacts to wetlands are prioritized as follows:

- (i) Restoration of a previously degraded or impacted wetland (with emphasis on prior converted areas) on-site or in the immediate project area;
- (ii) Restoration, including mitigation banking, off-site but within the eight digit United States Geological Survey hydrological unit in which the project is located;
- (iii) Restoration, including mitigation banking, outside of the eight digit United States Geological Survey hydrological unit in which the project is located;

10.1.2 BANK SITE AND WATERSHED OF HIGH ECOLOGICAL VALUE

In contrast to the Wolf River downstream of Collierville, the Wolf River Mitigation Bank II is located in a reach of the river above Collierville which undergoes normal flooding regimes because it is unaffected by head cutting and the resulting disconnection with its floodplain.¹¹ The watershed has been identified by the Tennessee Division of Forestry as one of fourteen *Forest Legacy Areas* in Tennessee and is ranked as one of the four highest priorities in the Legacy program. Additionally, the Tennessee Department of Environment and Conservation rates the Wolf as “statewide and regionally significant” for its natural and scenic qualities as well as fully supporting of all designated uses.¹² Further, the Memphis District Corps has determined that unaltered ecosystems of the type associated with the Wolf River hardwood bottom land forests are nationally significant¹³.

The Wolf River Corridor contains extant populations of plant and animal species considered rare, threatened, or endangered including: southern twayblade (*Listera australis*), capillary hairsedge (*Bulbostylis ciliatifolia* var. *coarctatus*) shining ladies’ tresses (*Spiranthes lucida*), red iris (*Iris fulva* var. *leitheria*), copper iris (*Iris fulva*), southern rein-orchid (*Plantanthera flava* var. *flava*), Corkwood (*Leitneria floridana* Chapm.)¹⁴, river otter (*Lutra Canadensis*), great blue heron (*Ardea herodias*), grasshopper sparrow (*Ammodramus savannarum*), northern madtom (*Noturus stigmosus*) naked sand darter (*Ammonocrypta beani*), blue sucker (*Cyceptus elongates*), and blossom mussel (*Epioblasma turgidula turgid*).

10.1.3 WATERSHED IDENTIFIED FOR PRESERVATION WITH HIGH PUBLIC INTEREST

Because of its unique ecological, scenic and recreational attributes, preservation and protection of the Wolf River has gained significant public support. The best example of this support is the Wolf River Conservancy (WRC) which was established in 1985 as a non-profit [501(c)(3)] organization dedicated to conserving and enhancing the Wolf River and its environs. Since inception the WRC has protected 14,000+ acres of the estimated 40,000 acres of forested floodplain acreage within the Wolf River watershed. The WRC goal is to ultimately protect the entire 40,000 acres of forested floodplain.¹⁵

The attached figure shows the location of the Wolf River Mitigation Bank within the watershed targeted for protection by the WRC. The establishment of the initial Wolf River Mitigation Bank in 2001 added over 765 acres towards the WRC goal: not only protecting over 500 acres of forested floodplain but returning in excess of 200 acres of farm land back to bottomland hardwood forest.

¹¹ Weins, Karen and Thomas H. Roberts. 2003. Effects of Headcutting on the Bottomland Hardwood Wetlands Adjacent to the Wolf River, Tennessee ERDC TN-WRP-HS-CP-2.1 February 2003

¹² Tennessee Rivers Assessment Project Summary Report 1998. <http://www.state.tn.us/environment/wpc/publications/riv/how.php#score>

¹³ U.S. Army Engineer District, Memphis. (1995). “Wolf River Reconnaissance Report, Memphis, Tennessee,” Memphis, TN, USA.

¹⁴ Shaws Creek ca. 1 mile S of Hodges School, access by boat from Road/creek crossing. Site marked by Paul Somers, the site is altered by bridge construction. *Leitneria floridana* reported from this site by Betty Tabatabai (Formerly Betty Thompson) collected in 197?. Only record for Tennessee. B.E. Wofford, Ph.D. UT Herbarium does not list this species because no specimen has been located. Personal communication with Patricia B. Cox, Ph.D. Botanist TVA Heritage Program and B.E. Wofford, Curator of UT Herbarium.

¹⁵ See Wolf River Conservancy Webpage at <http://www.wolfriver.org/index.html>

10.1.4 *BANK SIZE SUFFICIENT TO YIELD SIGNIFICANT ECOLOGICAL BENEFITS*

The proposed Bank II would restore, establish, enhance and protect an additional 666 acres and when added to the adjacent 765 acres composing the successfully completed and sold out Wolf River Mitigation Bank I results in mitigation site of over 1,400+/- acres; a mitigation site larger than 85% of all wetland mitigation banks permitted nationwide.¹⁶ The size and location within the Wolf River watershed alone qualifies the site as sufficient to yield ecological benefits to justify its existence. When considered with the actions of the WRC and other adjacent preserved and publicly owned properties, the ecological significance of the site is of national scale.

10.1.5 *WATERSHED UNDER IMMINENT AND DEMONSTRABLE THREAT*

As the IRT is aware, the presence of jurisdictional wetlands does not mean that a property owner or government agency cannot undertake any activity on the property which would result in loss of wetland functions and services. In fact, wetlands regulated under Section 404 do not necessarily even result in restricting the use of a site. Many activities are not regulated at all, explicitly exempted from regulation, or authorized under general permits. These facts are important when considering the potential impacts of infrastructure associated with increased population growth as well as demands on the resource from other sources, particularly the timber industry. Therefore, true long term protection of properties of ecological, scenic and recreational value, by whatever method or reason, are key to maintaining high quality ecosystems.

In recent years Eastern Shelby County and Western Fayette County, Tennessee, as well as the bordering Mississippi counties to the south, have seen unprecedented population growth. The City of Oakland just a few miles north of the Bank site realized a 61% year over year growth in population in 2004. The completion of SR 385, now under construction 2 miles east of the Wolf River Mitigation Bank, the future construction of I-69 and planned upgrading of I-40, even with the most environmentally sensitive planning, will undoubtedly result in unavoidable impacts to the Wolf River watershed.

10.2 SOILS

Three hydric soil series and several non-hydric series are mapped throughout the proposed Bank (see Figures 4 & 5). Henry silt loam, terrace (Ht) (Typic Fragiaqualfs) is mapped throughout the existing agricultural fields in swales and drainage-ways¹⁷. The areas targeted for restoration are dominated by Henry silt loams. Waverly silt loam (Wv) (Typic Fluvaquents) is mapped in the central and western sections Tract. The areas with Waverly silt loams were commonly observed to have standing water and generally supported wetland vegetation adapted to inundated conditions. The Falaya silt loam (Fm) is primarily concentrated in the bottomlands of Shaws Creek. In addition to the aforementioned wetland soil types, the Collins fine sandy loam (Cm) mapping units contain inclusions of the hydric Waverly series.

¹⁶ Environmental Law Institute, *The Banks and Fees: The Status of Offsite Wetland Mitigation in the United States*. September 2002. p. 119. 40

¹⁷ NRCS Soil Survey for Fayette County, Tennessee

Several upland soil series (Grenada silt loam, Calloway silt loam, and Grenada-Gullied land complex) are also present within the proposed Bank. However, these soil types cover only a small fraction of the acreage within the Bank and are restricted to the northwestern and northern edge of the property in a zone of uplands and upland transition.

10.3 HYDROLOGY

Fayette County has, under normal circumstance, an annual precipitation in excess of 50 inches; of which approximately 30 inches occurs during the 200+ day growing season. As previously discussed, Bank II is located adjacent to the closed Wolf River Mitigation Bank which is located within the Shaws Creek watershed (a major tributary to the Wolf River) and both sites are contiguous to lands owned by conservation organizations and are adjacent to the Wolf River. Notwithstanding the channelization of Shaws Creek main channel and clearing impacts within the watershed over the last 100+ years, there has been extensive ditching and drainage improvements in the agricultural fields, removal and subsequent return of American beaver (*Castor canadensis*) populations (1930s to present), and substandard logging practices (circa 1990). The main stem of the Wolf River was straightened and enlarged in 1964, and sections of Shaws Creek were straightened prior to 1962¹⁸. In addition, many of the first order tributaries have been ditched and/or channelized to enhance field drainage, permitting cultivation of the cleared bottomlands. This is true of the proposed bank site, where altered drainage patterns have resulted in accelerated removal of surface water from agricultural fields and expedited the flow of floodwater through this area. The alteration of drainage patterns in these Fields was primarily accomplished by terracing and concentrating the movement of water away from the fields and into strategically placed drainages that flow into both adjacent wetlands and constructed ditches (see Figures 6 & 7).

Notwithstanding the fact that the PC field in question is connected to the floodplain and as previously discussed undergoes normal flooding, it will be only necessary to increase site hydrology by instituting actions which will cause the field to retain rainfall and the way to do that is by plugging drainage ditches and swales, and creating shallow excavations, as proposed.

Table 1. Statistical Summary of Flood Event Data.
USGS Wolf River Gauge @ Rossville, Tennessee¹⁹
(Period of Record 1930-1971)

Gauge Datum	300.74 ft. MSL
Maximum flood event	314.5 ft. MSL
Minimum flood event	309.1 ft. MSL
Median year flood event	311.9 ft. MSL
p1.25 (1.25 yr. return prob.)	311.3 ft. MSL
p100 (100 yr. return prob.)	314.5 ft MSL

¹⁸ Flowers, R.L. 1964. Soil Survey of Fayette County, Tennessee. U.S. Department of Agriculture, Soil Conservation Service in cooperation with the Tennessee Agricultural Experiment Station.

¹⁹ Data provided by George Law, USGS Nashville, Tennessee

10.4 VEGETATION

The vegetation within the Bank is similar to baseline conditions described for the Bank in the original MOA. Along with the 124 acres of PC that has been historically farmed, the buffer acreage includes uplands and extensive forested wetland communities within and adjacent to the Shaws Creek bottomland. Due to the numerous secondary channels and relic fluvial landforms, this bottomland features a diverse array of natural community types. However, exploitative timber harvesting operations (circa 1990) have altered the overstory species composition of mature forest stands that are adjacent to the PC acreage within the Bank. Examples of disturbance related “early successional” forest community types exist along the primary stream channels (Shaws Creek), tributaries, and in abandoned agricultural fields. Based on these early successional plant communities combined with geomorphic channel features, the main stem of Shaws Creek is currently in the aggradation stage of stream channel evolution following channelization.²⁰

Based on relatively undisturbed adjacent forest stands and residual overstory trees in selectively harvested stands within the Bank site, willow oak (*Quercus phellos*) (FACW-) is the dominant overstory species in the majority of seasonally to temporarily flooded mature forest stands (PF01A). Associated codominant overstory species include overcup oak (*Quercus lyrata*) (OBL), swamp chestnut oak (*Quercus michauxii*) (FACW-), water oak (*Quercus nigra*) (FAC), sweetgum (*Liquidambar styraciflua*) (FAC+), American elm (*Ulmus americana*) (FACW), green ash (*Fraxinus pennsylvanica*) (FACW), and cherry bark oak (*Quercus falcata* var. *pagodifolia*) (FAC+). Common understory species include winged elm (*Ulmus alata*) (FACU+), box-elder (*Acer negundo*) (FACW), deciduous holly (*Ilex decidua*) (FACW-), red maple (*Acer rubrum*) (FAC-OBL), red buckeye (*Aesculus Pavia*) (FAC) river birch (*Betula nigra*) (FACW), and persimmon (*Diospyros virginiana*) (FAC). These second bottom forest communities would primarily be classified within the willow oak forest alliance (I.B.2.e.23) and/or swamp chestnut oak, cherry bark oak, Spanish oak (*Quercus shumardii*) – sweetgum forest alliance (I.B.2.e.19) and are dominant within Ecological Zones IV and V²¹. Semipermanently flooded areas located in relic stream meanders, seasonal ponds, sloughs, and/or backswamps are dominated by water tupelo (*Nyssa aquatica*) (OBL) with bald cypress (*Taxodium distichum*) (OBL) as a major component (PF01F). Common understory species include bald cypress, red maple, and buttonbush (*Cephalanthus occidentalis*) (OBL). This forest type would be classified within the water tupelo – bald cypress forest alliance (I.B.2.g.03) and occurs mostly within Ecological Zone II²².

Early successional forest community types are present along the primary stream channels. The dominant species in these early successional forests include black willow (*Salix nigra*) (OBL), green ash, sycamore

²⁰ Hupp, C.R. 1992. Riparian Vegetation Recovery Patterns Following Stream Channelization: A Geomorphic Perspective. *Ecology* 73(4):1209-1226.

²¹ Wharton, C.H., W.M. Kitchens, E.C. Pendleton, and T.W. Sipe. 1992. The Ecology of Bottomland Hardwood Swamps of the Southeast: A Community Profile, U.S. Fish and Wildlife Service, Biological Report FWS/OBS-81/37.

²² Taylor, J.R., M.A. Cardamone, W.J. Mitch. 1990. Bottomland Hardwood Forests: Their Functions and Values. In: *Ecological Processes and Cumulative Impacts Illustrated by Bottomland Hardwood Wetland Ecosystems*, pp. 13-86, J.G. Gosselink, L.C. Lee and T.A. Muir (eds), Lewis Publishers, Chelsea, MI, 708 pp.

(*Platanus occidentalis*), (FACW-), silver maple (*Acer saccharinum*) (FACW), and river birch. In abandoned agricultural fields that are semipermanently/seasonally flooded (Zones II-IV), i.e., Tract 301, Field Nos. 20 and 26, almost pure stands of black willow have become established [black willow forest alliance (I.B.2.e.27)]²³. These willow stands are interspersed with very dense areas of emergent vegetation dominated by willow weeds (*Polygonum lapathifolium*) (FACW), swamp smartweed (*Polygonum hydropiperoides*) (OBL), and short-bristle beakrush (*Rhynchospora corniculata*) (OBL). In recently abandoned agricultural fields that are temporarily/intermittently flooded (Zones V-VI) a mixed sapling/herbaceous community has developed. This community is dominated by tree seedlings/saplings including sweetgum, green ash, sycamore, and black willow. The herbaceous stratum includes bearded beggar ticks (*Bidens aristosa*) (FACW), giant goldenrod (*Solidago gigantea*) (FACW), late-flowering thoroughwort (*Eupatorium serotinum*) (FAC), deer-tongue grass (*Panicum* sp.), marsh seedbox (*Ludwigia peploides*) (OBL), and purple ammannia (*Ammannia coccinea*) (FACW+).

10.5 CURRENT LAND USE

The Bank is located in western Fayette County near Collierville, within 20 miles of Memphis (Figures 1 and 3). The Bank site is approximately 666 acres and contains an array of existing land uses; primarily cultivated agricultural fields with hydric and non-hydric soils, early successional abandoned fields, bottomland hardwood forests, and deep-water *Tupelo* swamp. The site may be accessed from State Road 196 (Chulahoma Road) and is entirely within the Gulf Coastal Plain Province; underlain by Quaternary loess deposits. Cultivated areas with hydric soils, i.e., PC fields, total 124 acres. Remnant bottomland hardwood stands with hydric soils have been hydrologically modified by minor ditching within the tract.

Notwithstanding the channelization of Shaw's Creek main channel and clearing impacts within the watershed over the last 100+ years, there have been specific hydrologic modifications including construction of Chulahoma Road (date unknown), extensive ditching and drainage improvements in fields west of Chulahoma Road (pre-1962), removal and subsequent return of American beaver (*Castor canadensis*) populations (1930s to present), and substandard logging practices (circa 1990). Although it appears that Shaw's Creek originally split into two distinct channels on the east side of Tract No. 301 where most of the flow has been channelized through two bridges under Chulahoma Road. The minor ditching and drainage improvements within Tract No. 301 have resulted in accelerated removal of surface water from these fields. The major dredging of a channel in Shaw's Creek bottomland has accelerated the flow of floodwater through this area.

²³The Nature Conservancy. 1995. A Vegetation Classification for the Southeastern United States (working draft of October 5, 1995), Community Ecology Group, Conservation Science Department, Southeast Regional Office, Chapel Hill, N.C

11.0 ASSURANCE OF SUFFICIENT WATER RIGHTS TO SUPPORT THE LONG TERM SUSTAINABILITY OF THE BANK

Raleigh LaGrange, G.P. owns the property fee simple, including all mineral rights. Water rights in Tennessee are governed by common law.

12.0 DEFAULT AND CLOSURE PROVISIONS

12.1 FORCE MAJEURE

In the event that a natural disaster destroys all or part of the Bank, all debiting from the Bank shall cease immediately. Such natural disasters include floods, tornados, fires, earthquakes, droughts, disease, regional pest infestation, etc., which the Corps, in consultation with the IRT, determines is beyond the control of the Sponsor to prevent or mitigate. The Sponsor shall not be responsible for restoring acreage for credits which were sold prior to any such natural disaster.

However, the Sponsor shall be responsible for restoring acreage for which credits have been released to the Sponsor if those credits are unsold at the time of the natural disaster. If the damage is so severe that the Sponsor and the Corps, in consultation with the IRT, determine that project success is unattainable, then the Sponsor will not be obligated to restore any portion of the Bank.

12.2 DISPUTE RESOLUTION

Resolution of disputes about application of this Mitigation Banking Instrument shall be in accordance with those stated in 33 CFR Part 332.8(d)(8)(e).

12.3 VALIDITY, MODIFICATION, AND TERMINATION OF THE MITIGATION BANKING INSTRUMENT

This Mitigation Banking Instrument will become valid on the date of the last signatory's signature. This Mitigation Banking Instrument may be amended or modified with the written approval of all signatory parties as described in 33 CFR Part 332.8(d). Any of the IRT members may terminate their participation upon written notification to all signatory parties. Participation of the IRT members will terminate 30 days after written notification.

12.4 SPECIFIC LANGUAGE OF MITIGATION BANKING INSTRUMENT SHALL BE CONTROLLING

To the extent that specific language in this document changes, modifies, or deletes terms and conditions contained in those documents that are incorporated into the Mitigation Banking Instrument by reference, and that are not legally binding, the specific language within the Mitigation Banking Instrument shall be controlling.

12.5 TRANSFER OF BANK/MBI OWNERSHIP

In the event of sale or transfer of the Bank and/or MBI to a third party, the transfer provision of this MBI must be completed and filed with the IRT. The Banker shall first notify the Chair(s) no less than 60 days prior to the transfer. Once the transfer has been executed by the Sponsor/Owner, the Transferee/new Owner remains responsible for the Bank and all applicable provisions of the approved MBI and Bank Development Plan.

13.0 RESPONSIBILITIES OF THE IRT

13.1 OVERSIGHT

The agencies represented on the IRT agree to provide appropriate oversight in carrying out provisions of this Mitigation Banking Instrument.

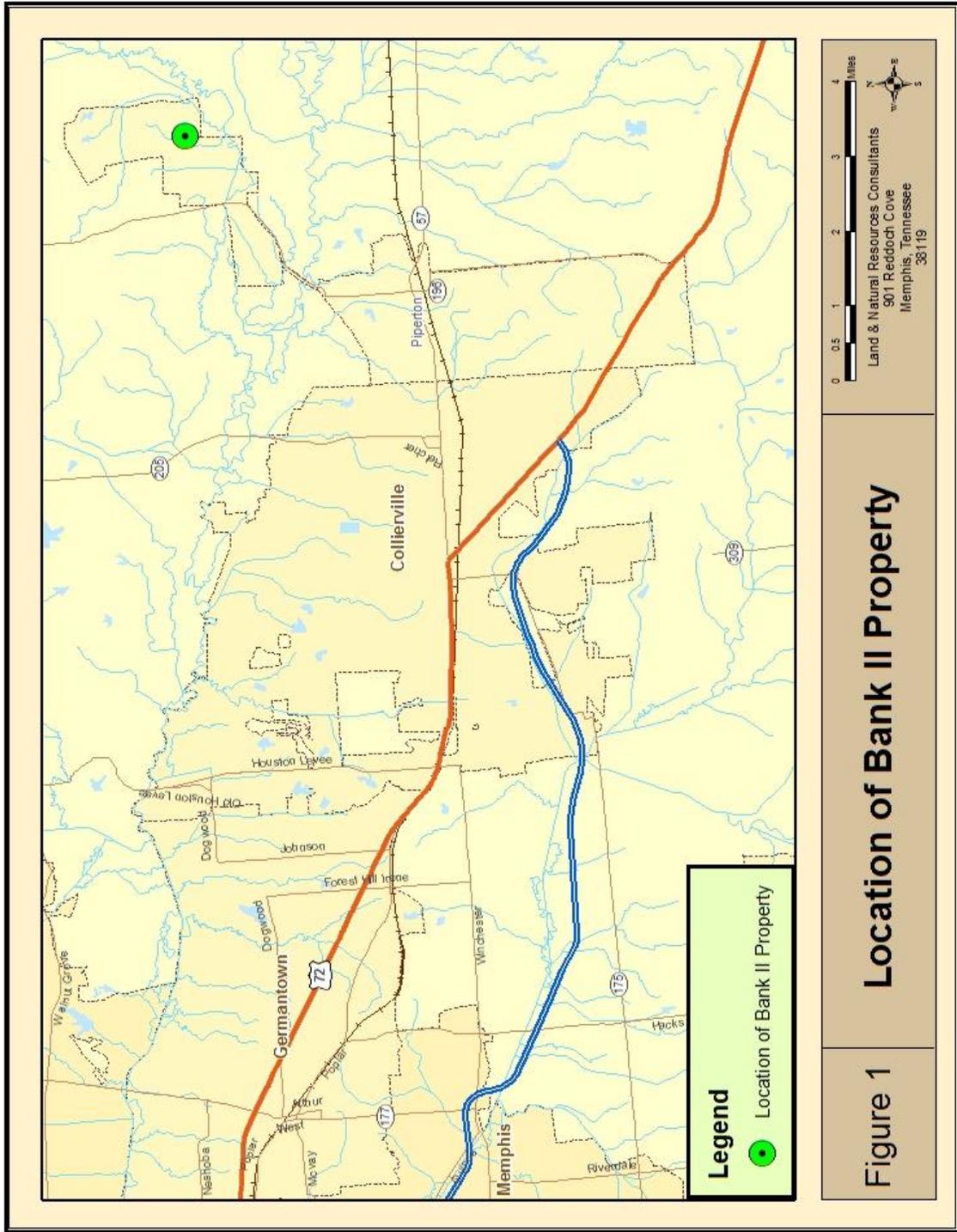
13.2 REVIEW AND COMMENTS

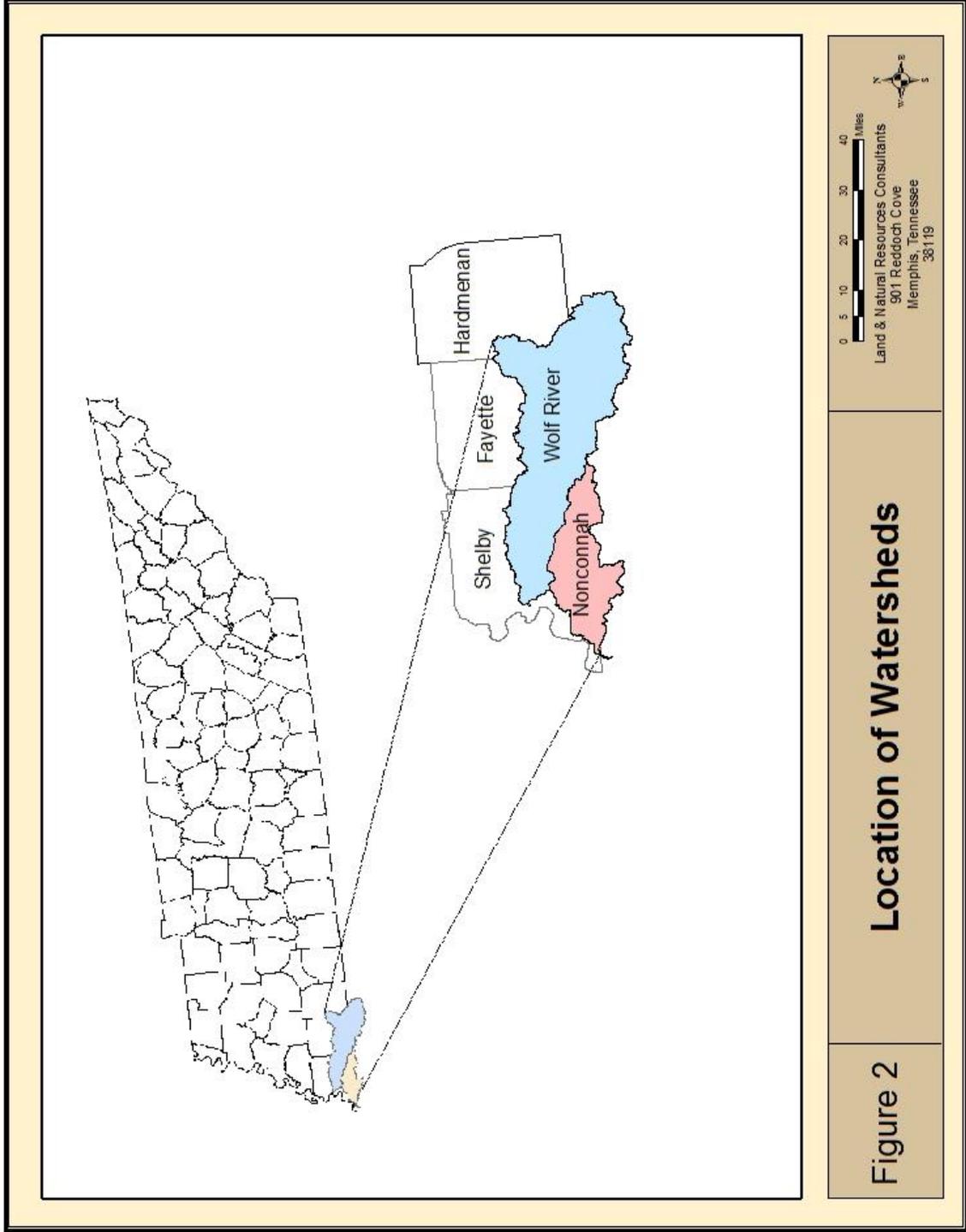
The IRT will review and respond to complete submissions related to this mitigation banking instrument within the timeframes described in 33 CFR Part 332.8.

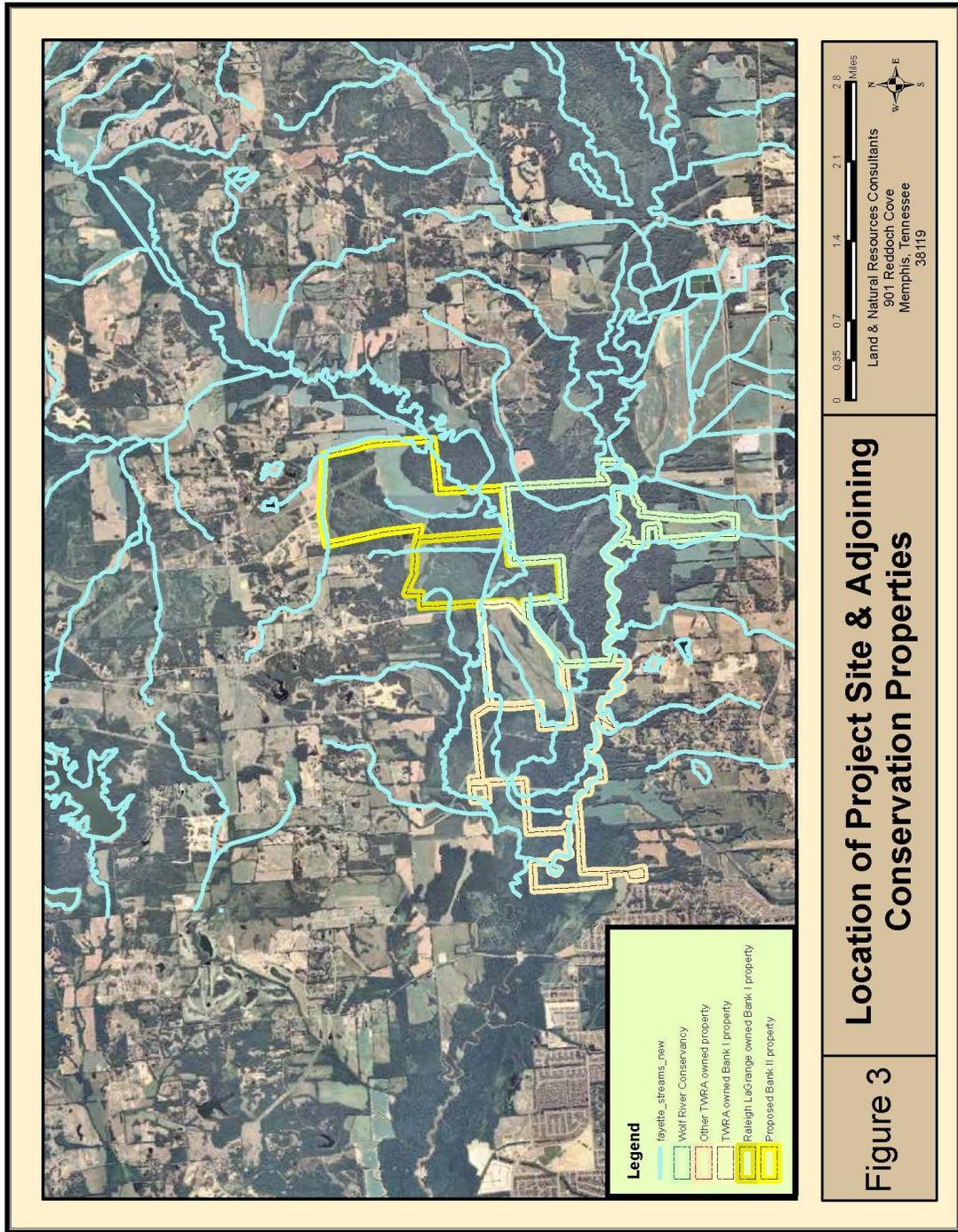
13.3 COMPLIANCE INSPECTIONS

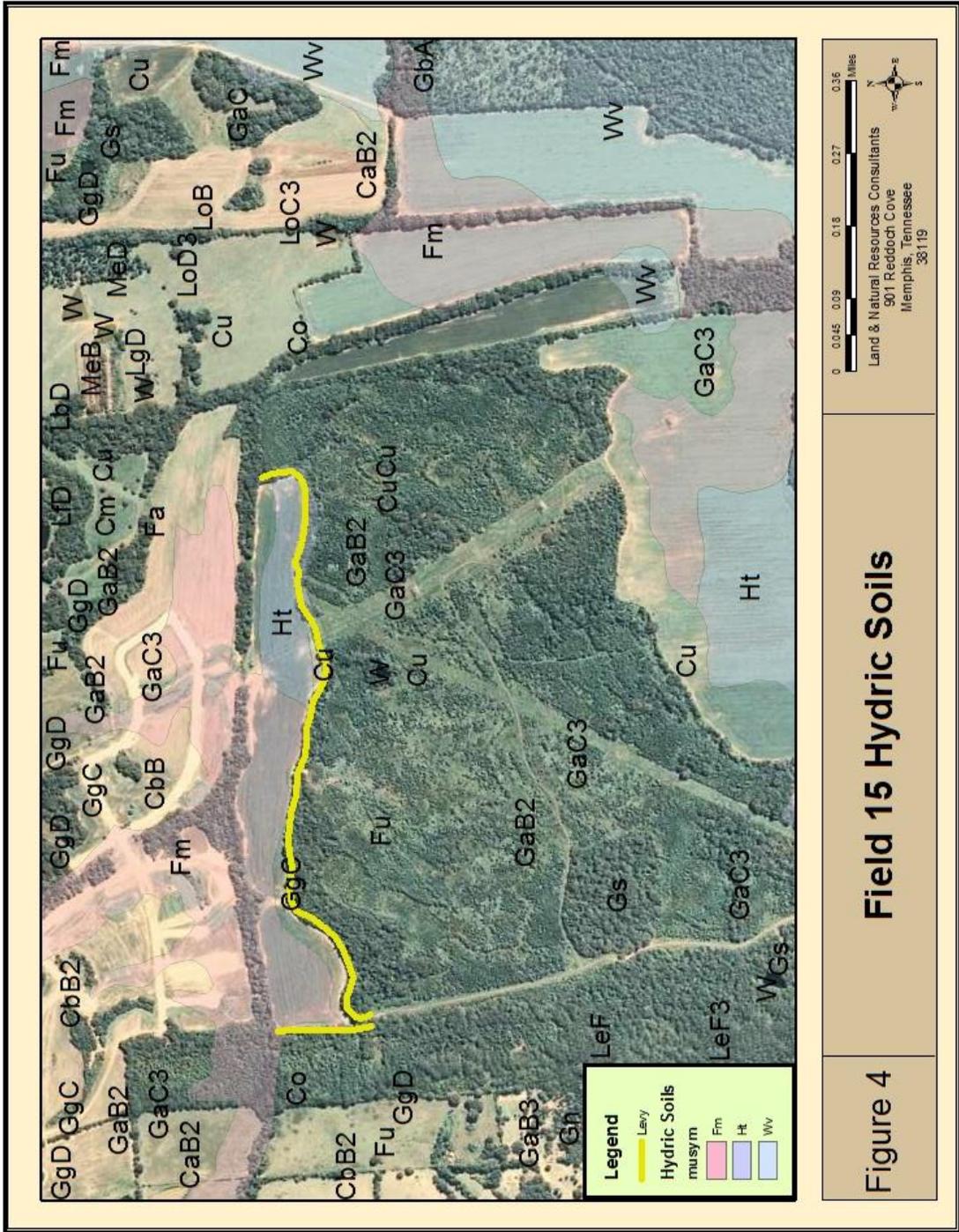
The IRT shall conduct compliance inspections as necessary, as determined by the Corps in consultation with the IRT. The purpose of these inspections will be to verify whether all performance standards have been met, to release credits to the Bank, and/or to recommend remedial actions (if any), until the terms and conditions of this Mitigation Banking Instrument and Bank Development Plan have been determined to be fully satisfied or until all credits have been sold, whichever is later. The IRT will provide the Sponsor a minimum of 24 hours' notice before any compliance inspection or other visit to the Bank site.

FIGURES









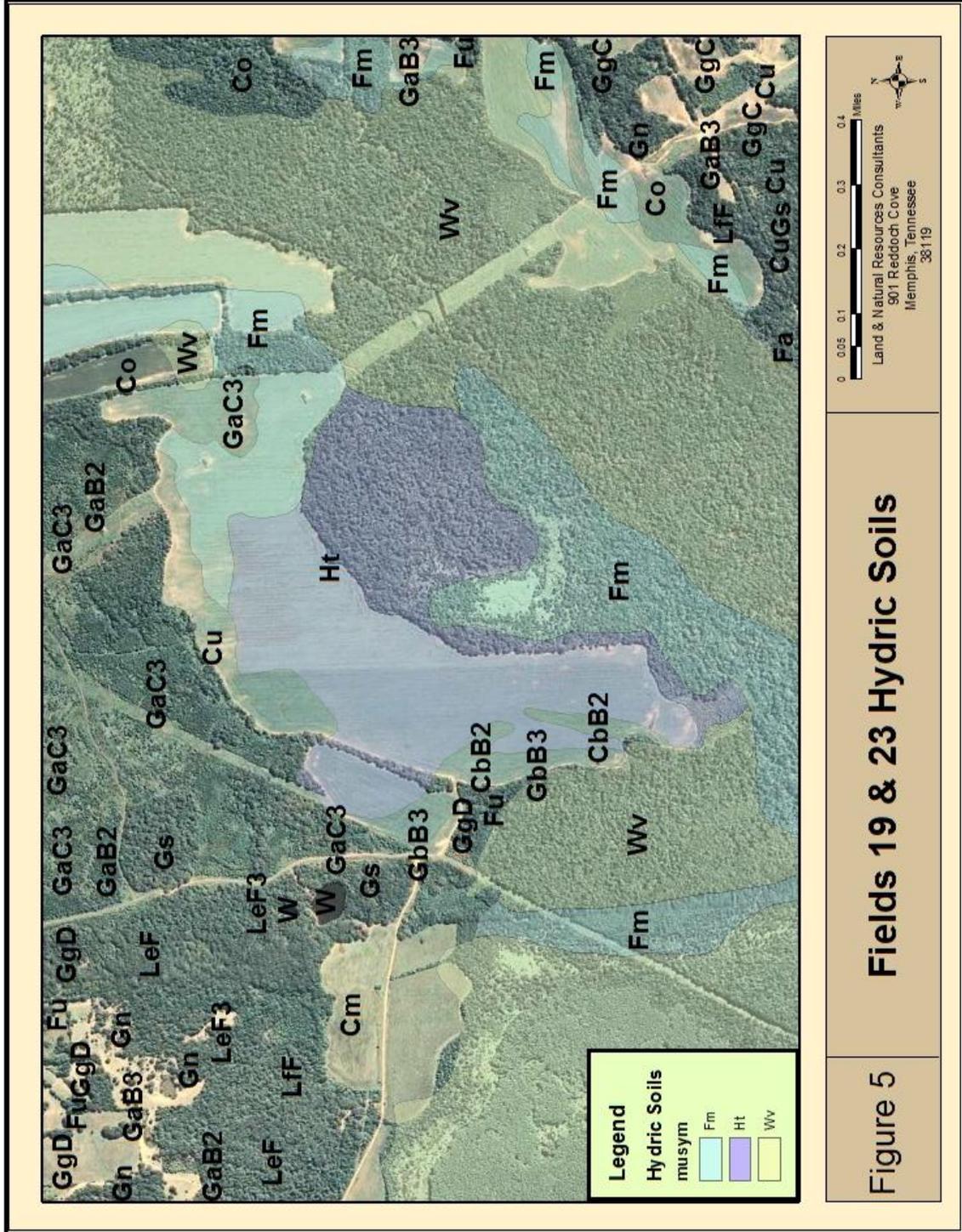
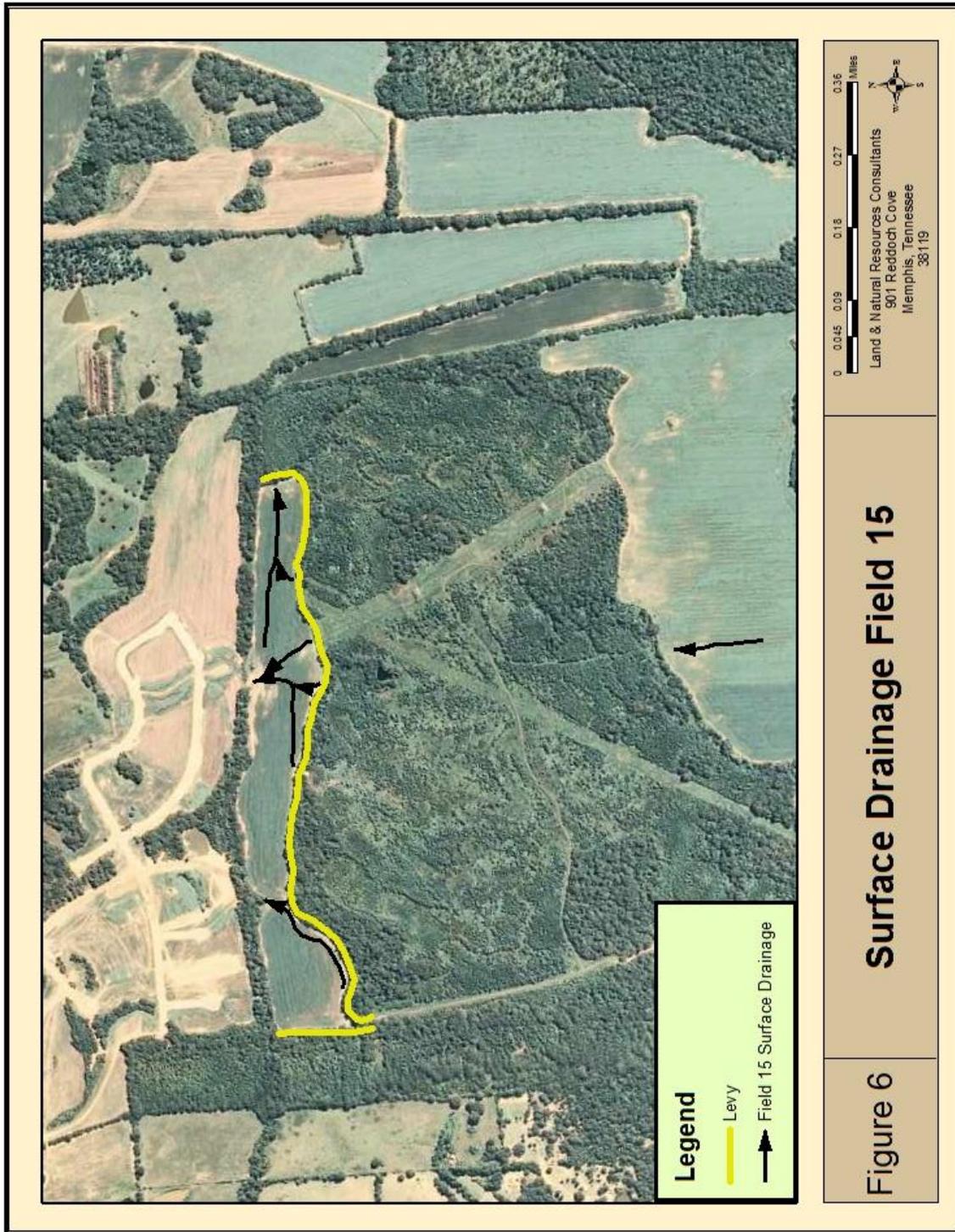
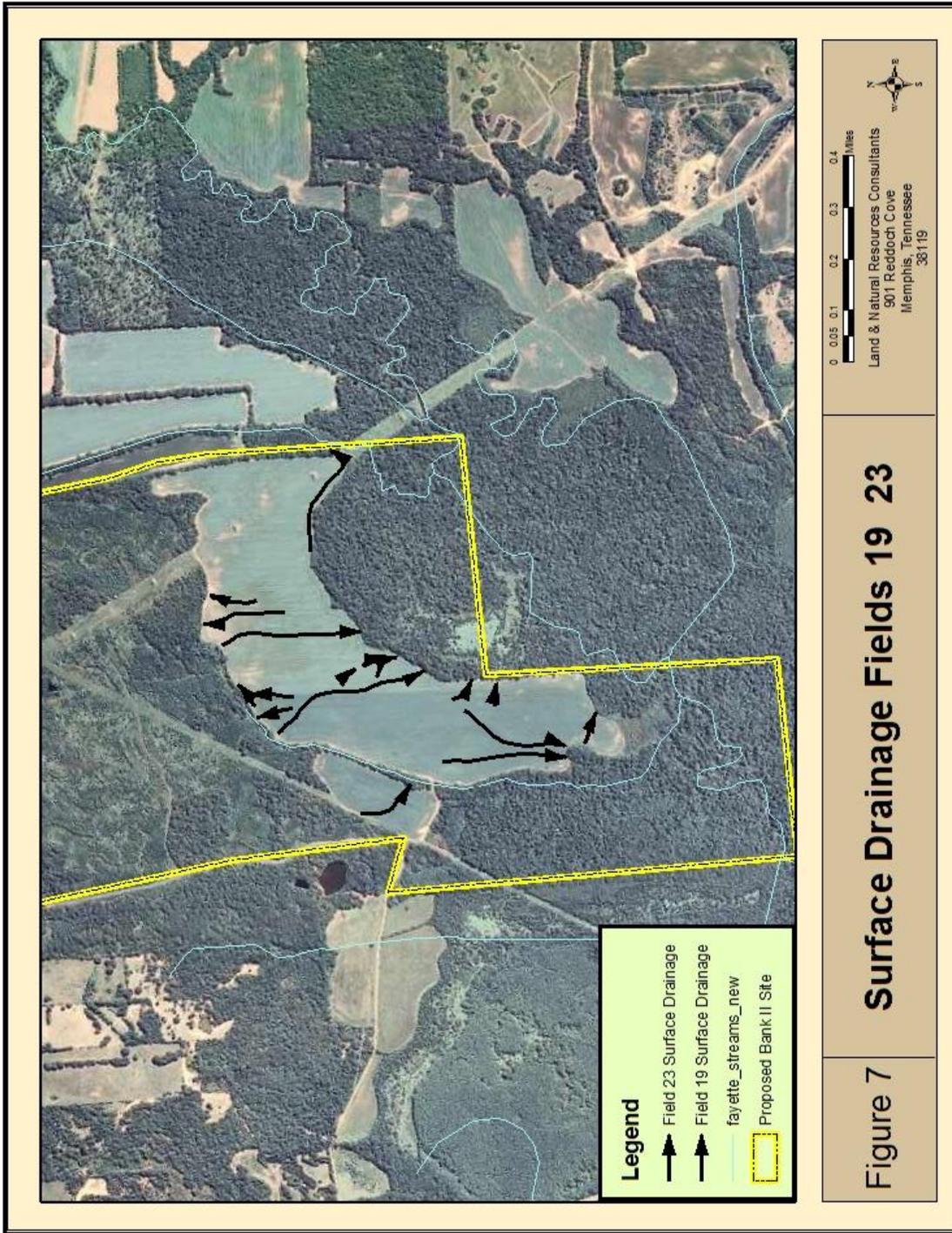
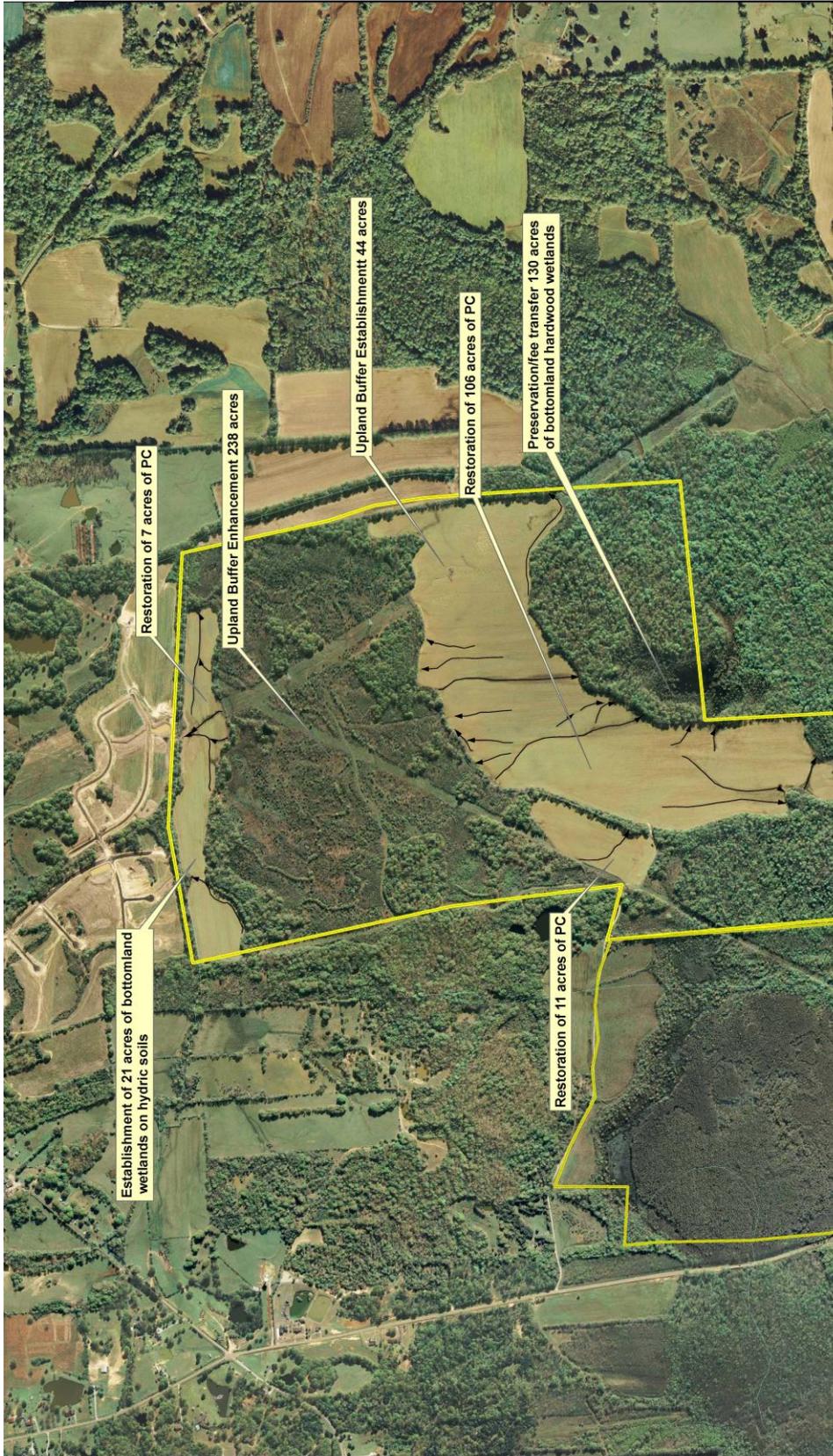


Figure 5

Fields 19 & 23 Hydric Soils







	Land & Natural Resources Consultants, LLC Richard C. Young, M.S. Natural Resource Scientist Brentwood, Tennessee 37027 Date: April 7, 2012
	Sheet No. 1 Bank Plan
Source - Tennessee GIS Data Server	
Figure 8. Bank Development Plan	

