MARI-OSA DELTA REGION
MITIGATION BANK DEVELOPMENT PLAN

Environmental Unit
Design Division
District 5

MoDOT

MoDOT MARI-OSA REGION

Mitigation Bank Development Plan

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MoDOT Mari-Osa Delta Region Mitigation Bank Development Plan

This Development Plan regarding the establishment, use, operation, and maintenance of the Missouri Department of Transportation Mari-Osa Delta Region Mitigation Bank (hereinafter, Bank); is made and entered into by and among the Missouri Department of Transportation (MoDOT), the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (FWS), the Federal Highway Administration (FHWA), the Missouri Department of Natural Resources (MDNR), and the Missouri Department of Conservation (MDC), with reference to the following:

I. PREAMBLE

A. Purpose: The purpose of this Bank Development Plan (BDP) is to provide guidelines and assign responsibilities for the establishment, use, operation, and maintenance of the Bank. The Bank will be used for compensatory mitigation for unavoidable impacts to waters of the United States, primarily in the Osage River Drainage Basin, including wetlands, streams, and other aquatic resources. Such impacts are expected to result from MoDOT activities authorized under Section 404 of the Clean Water Act (CWA), and Federal Highway Administration (FHWA) rulemaking on Mitigation of Impacts to Wetlands. Compensatory mitigation must meet all applicable requirements and be authorized by the appropriate authorities.

In addition to compliance with the regulatory authorities listed above, this Bank is intended to be the primary method by which MoDOT meets the net-gain goals expressed in the FHWA rulemaking on Mitigation of Impacts of Wetlands, the President's Wetland Plan of 1998, and the Missouri Executive Order 96-03. MoDOT will comply with CWA Section 404(b)(1) Guidelines by applying the following mitigation sequence for MoDOT project impacts and in general Bank establishment:

1) Avoid wetland, stream and aquatic (streams and natural lakes) impacts through the use of practicable alternatives;

2) Minimize wetland, stream and aquatic impacts using all reasonable actions to reduce impacts; and

3) Compensate for unavoidable wetland, stream and aquatic impacts and loss of aquatic function.

Approval of this Bank Development Plan does not guarantee that the USACE will accept the use of this Bank for a specific project. On-site mitigation opportunities must be evaluated on a project-by-project basis prior to use of this Bank. However, as stated in the federal mitigation banking guidance, use of a Bank to compensate for small impacts associated with linear projects and authorized by nationwide permit is preferred to on-site mitigation.

B. Location and Ownership of Parcel: MoDOT owns 42.66 acres of land known as Mari-Osa Delta, at the confluence of the Maries and Osage River in Section 2 and 3, of Township 43 North, Range 10 West, Westphalia East and West quadrangles, in Osage County, Missouri (Figure A). The parcel is located in the Osage River Basin, near the confluence of the Maries River into the Osage River in the Lower Osage 8-digit Hydrologic Unit (Figure B). MoDOT has developed a mitigation plan to establish and maintain a wetland and wooded riparian buffer on 34.2 acres of the property. An existing 3.8-acre mitigation area is already established on the site. A portion of the remaining acreage is devoted to construction of a MoDOT maintenance shed facility. MoDOT is currently developing a deed restriction to protect the Bank site and existing mitigation area in perpetuity.

The 34.2-acre portion of the area MoDOT is proposing as a mitigation Bank for transportation projects is located on the eastern side of the levee, just east of the power line. The existing 3.8-acre mitigation area is located on the western side of the levee. The entire 42.66 acres (including maintenance shed and existing mitigation area) are described as follows:

- A tract of land situated in and being a part of the Southwest Quarter of the Southwest Quarter and the Northwest Quarter of the Southwest Quarter of Section 2, and the Southeast Quarter of the Southeast Quarter of Section 3, Township 43 North, Range 10 West and also being the tract of land described by deed recorded at Book 249, Page 353 of the Records of Osage County, Missouri, containing 42.66 acres of land.

C. Project Description: MoDOT plans to establish and maintain forested, scrub shrub, and emergent wetlands including a riparian buffer on 34.2 acres of the Mari-Osa Delta property (Figure C).

Site Selection: The site was selected based on proximity to a previous project requiring mitigation. The existing on-site mitigation consists of 3.8-acres of forested, scrub-shrub, and emergent wetlands (Photograph 1). The remaining parcel was deemed to be a good candidate for a bank based on the watershed, location at the mouth of the Maries River, proximity of species of conservation concern and history of frequent flooding.

Effects On-Site: The site will provide floodwater storage from the Maries River and surface-flow water storage from the small watershed off the adjacent pasture. The Bank site will provide dissipation of energy (stream bank erosion control) from the Maries River, which is actively eroding the bank of the river on the side opposite the Bank site, by providing a relief for backwater flows from the Osage and containment of high-water flows during storm events. The opposite stream bank of the Maries River is currently managed under private ownership and is enrolled in the Conservation Reserve Program, a program administered by the Farm Service Agency. Other important effects include cycling of nutrients, removal of contaminants in runoff from the adjacent pasture such as pesticides and herbicides; replenish soil moisture in an area that has historically been drained, and import/export of plant propagules. The site will provide potential feeding, resting, hiding, escape, nesting and brooding sites for vertebrates and feeding surfaces for invertebrates. The Bank site will also include protection of a prehistoric archaeological site.

Since the property was purchased, there have been deer sightings, ducks using the site when flooded, numerous amphibians found in vernal pools and various other wildlife benefiting from the property.

Effects Off-Site: The site will help reduce downstream delivery of peak discharges, improve water quality, and provide habitat cover. In addition, there are numerous endangered species in the Maries and Osage River, including occurrences of freshwater mussels such as pink mucket (listed as imperiled in the state and globally by the Missouri Department of Conservation), rock pocketbook (listed as vulnerable in the state by the Missouri Department of Conservation), and black sandshell (listed as imperiled in the state by the Missouri Department of Conservation) just downstream at the Route 50/63 bridge. In the Maries River, occurrences of the freshwater mussel species black sandshell (imperiled) are also found directly upstream of the Bank site.

Mitigation Bank Breakdown:

Riparian Corridor (10.2 acres)

Preservation (5.5 acres)

The existing riparian corridor along the Maries River averages 77 feet in width (measurements taken at eight locations), encompassing 5.5 acres, or 1,400 linear feet. This existing corridor will be preserved and credits available will be calculated using a modified version of the Little Rock Stream Method for preservation.

Palustrine Forested Wetland (PFO) (5.2 acres)

Creation (2.8 acres)

The two mounds, 2.8 acres (1.5 and 1.3 acres), in the center of the site will be slightly higher in elevation than the adjacent swales since there will be no grading allowed in these areas and will be planted with trees around the existing pecans. The two existing old growth pecan trees will be preserved. These two mound areas will function as forested wetlands.

Creation (2.4 acres)

There is approximately 2.4 acres of riparian PFO that will be planted in trees between the slope line of the existing berm and existing preserved riparian corridor along the Maries River (Figure C). A small berm (i.e., rice levee) will be constructed along the drip line of the existing riparian corridor in order for this area to function as forested wetland when the Maries River top it's banks and floods into the site.

Together (5.2 acres) these forested wetland credits will be calculated using a modified version of the Charleston Method for wetland creation.

Palustrine Emergent Wetland (PEM) (16 acres)

Creation (10.7 acres)

The remainder of the site will be excavated to create swales and emergent wetland habitat around the mounds (Figure C). The existing ditch on the east side of the property will be plugged and redirected into the site just south of the archaeological site to provide an additional surface water component for achievement of historic wetland hydrology. A large portion of the PEM area occurs on non-hydric soils, which will primarily be emergent wetland (Figure E). These credits will be calculated using a modified version of the Charleston Method for wetland creation.

Restoration/Enhancement (5.3 acres)

A small portion occurs on hydric soils, which will primarily be emergent wetland (Figure E). These credits will be calculated using a modified version of the Charleston Method for wetland restoration/enhancement.

Wetland Buffer (2.8 acres)

Creation (2.8 acres)

The area between a future MoDOT maintenance shed and the emergent wetland, approximately 2.8 acres in size, will be planted in trees and credited as upland forest/wetland buffer (Figure C). This area will provide diversity in habitat, help to correct some existing erosion and function as a buffer between the future maintenance shed and the Bank. These credits will be calculated using a modified version of the Charleston Method for wetland creation.

Restoration/Enhancement (4.7 acres)

The 4.7 acres designated as the archaeological site on Figure C, will planted with trees to preserve the integrity of the area. Other than the planted trees, the archaeological area will remain

undisturbed. This area of bottomland forest will provide diversity in habitat on the site and serve as a connection between the ephemeral swales, the Maries River riparian corridor, and a buffer to the adjoining pastureland. This site encompasses 4.7 acres. This buffer occurs on hydric soils and will be restored to bottomland forest. The credits available will be calculated using a modified version of the Charleston Method for wetland restoration/enhancement.

D. Baseline Conditions: The Bank site consists of upland area from the service road north of Route 50 sloping into the floodplain of the Maries River. It receives surface runoff from a small surrounding watershed, approximately 20 acres, that drains mainly west into the Maries River. The area was in agricultural use from 1996-2002 before MoDOT purchased it in April 2002. Once acquired by MoDOT, berms were constructed to hold water in the mitigation area and the Bank site was left fallow. The area has not been cropped since MoDOT purchased the property, however, it has been mowed once a year.

Local land use is a mix of residential, row crop, pasture and commercial. Local development along the outer road includes a commuter parking lot, at least three businesses' and a gas station. Directly north of the Bank is currently in agricultural use and directly east of the Bank is pasture. Directly west of the Bank along the Osage River is currently residential property with primary and seasonal residences.

Existing Mitigation Area
The existing mitigation area was constructed in 2004. Two monitoring reports (as-built in 2004 and 1st year in 2005) have been submitted to Mark Frazier, USACE-Kansas City District.

Maintenance Facility
The far southeast corner of the property is to be developed into a MoDOT maintenance facility (Figure A). The site is upland and hydrology of the site is not directly connected to the Bank site. Any runoff from the facility is designed to be channeled into an existing ditch system that will bypass the Bank site and the existing mitigation area and flow directly into the Maries River (Photograph 2). The facility is to be constructed in the future, with no known schedule.

Existing Soils and Hydrology: According to the Soil Survey of Osage County, Missouri, the Bank site (Figure F) is mapped as Dockery silt loam, 0 to 2 percent slope, a somewhat poorly drained, frequently flooded non-hydric soil; Racoon silt loam, 0 to 3 percent slope, a poorly drained, rarely flooded hydric soil; Wrengart silt loam, 9 to 14 percent slope, a moderately well drained, non-hydric soil; and Gabriel Silt Loam, 0 to 2 percent slope, a rarely flooded, poorly drained hydric soil.

Historically, the site was leveled for cultivation and a drainage swale that cut across the field and discharged into the Maries River on the west side of the property was cut off and directed straight north into a drainage ditch and directly to the Maries River. Hydrology can be restored to the area by redirecting the drainage swale back into its original path on the site. The swale receives surface runoff from a small surrounding watershed of approximately 20 acres that drains mainly west into the Maries River and is the primary source of hydrology on the site. The Maries and Osage Rivers also provide hydrology through over bank flow events (Graph 1).

NRCS Delineation
The Natural Resources Conservation Service conducted a certified wetland delineation on the site June 18, 1999. NRCS determined that none of the agricultural land is wetland, rather it is classified as either prior-converted or non-wetland (Figure E). The Soil Survey of Osage County, Missouri indicates the PC-designated area is composed of a rarely flooded, poorly drained, hydric soil map unit, Racoon silt loam, likely to have historically been wetland. The soil survey also indicates the rest to be Dockery silt loam, a frequently flooded, non-hydric soil, and not likely to have been wetland (Figure F).

Grading of the site and diverting the drainage swale for agricultural use has altered the hydrology. This hydrologic modification enhances drainage of the site and has increased the quantity and rate of surface runoff. The USDA's delineation for Tract 3923 determination that none of the agricultural land had a wetland signature in over half of the normal years. "None of the PC was a concave depression, without drainage, that would allow it to pond water for 15 days".

State Historic Preservation Office Clearance
In accordance with Section 106 of the National Historic Preservation Act, on May 28, 2002, the State Historic Preservation Officer (SHPO) provided written concurrence that one site within the proposed bank area was identified as having sparse, prehistoric evidence. They also concurred that the site will not be adversely affected because the testing has demonstrated there is no integrity in the impacted site (Attachment 1).

E. Mitigation Bank Work Plan:

Restoring Hydrology: The drainage swale will be redirected into the Bank site, along its original path and detained within the Bank site by an exterior berm (existing). Additional swales throughout the site will be excavated to create emergent pools on the north and south side of the historic swale. At the western side of the Bank site, rock berms will allow the water to be dissipated into the water control structure, which will then flow into the existing mitigation area and finally into another water control structure ultimately discharging into the Maries River. The two water control structures will allow the water to be manipulated as necessary, however, only when needed. The Bank site and existing mitigation area are designed to be fully functional without active manipulation.

The area between the existing berms and the existing riparian corridor, on the north side of the site, will be planted with trees to establish a forested wetland. A one-foot furrow berm will be placed on the edge of the dripline of the existing riparian corridor. This system will function as a forested wetland as water from the Maries River backs up into it and is retained by the furrow berm along the dripline.

Additional hydrology will come from over bank flood events. Since MoDOT purchased the site in 2003, the Maries River has backed up into the site at least seven times (Graph 1).

Water Management: Following site construction, the water levels will be maintained with the primary objective of obtaining maximum growth for the planted trees. Secondary water management will be: (1) to provide shallow-water foraging habitat for migratory waterfowl, waders, and shorebirds during wintering and migration, and (2) to maximize herbaceous plant biomass production during the growing season while avoiding conditions favorable to establishment of aggressive, weedy species [*e.g.*, cocklebur (*Xanthium spp.*)]. Once these initial objectives have been met, water levels will be maintained to meet the success criteria established in the Umbrella Instrument (UI).

Soil Amendments: After the soil is graded, the site will be amended with lime and fertilizer, if needed, to bring soil up to test standards generally accepted for farming in the region. Although nitrogen can be part of the fertilizer mix, potash (potassium) and phosphorus deficiencies are the primary concerns, along with low pH, and possibly low organic matter. Soil material from the excavated areas shall be segregated to dispose of the top 4-6 inches for weed control, specifically, Johnsongrass removal.

Vegetation Specifications: All areas designated for tree or shrub planting will be planted with 3-gallon root production method (RPM^{TM}) trees and shrubs to reforest the Bank; the trees will be treated with mycorrhizal inoculation and will be planted at 20-foot spacing with appropriate competition control and

soil amendments. All 3-gallon container-grown trees and shrubs shall be healthy, and be at least 1/2-inch caliper and 18-30 inches in height. All container grown trees and shrubs shall have a dense fibrous non-curling root system. Only trees and shrubs native to the Mid-Missouri region will be acceptable. The following species will be planted:

Trees	Pecan (*Carya illinoinensis)* swamp white oak (*Quercus bicolor*), pin oak (*Quercus palustris*), green ash (*Fraxinus pennsylvanicus*).
Shrubs	buttonbush (*Cephalanthus occidentalis*), rosemallow (Hibiscus laevis), silky dogwood (*Cornus amomum*), and blackhaw viburnum (*Viburnum prunifolium*).

Vegetation Restoration: The restoration objectives for the riparian, forested wetland area outside of the berm are: (1) stabilizing soil to reduce bank erosion; and (2) providing tree-dominated habitat for non-game bird species. The forested wetland area will not be seeded with warm season grasses if it is not disturbed by heavy equipment and therefore will have ground cover. If the contractor chooses to construct the furrow berm by scraping the ground, the area is required to be seeded with warm season grasses. The upland wetland buffer will be seeded with warm season grasses. The archaeological site and mounds will not be seeded because it will not be disturbed by heavy equipment and therefore will have ground cover. Trees planted are listed above.

Existing vegetation at the Bank site is located in Table 1.

F. Establishment and Use of Credits: Whereas, in accordance with the provisions of the UI, this BDP, and upon satisfaction of the success criteria contained herein, a total of 28.7 wetland acres will be available to use as compensatory wetland mitigation and 10.2 stream acres (5.5 acres preservation and 4.7 acres creation) available to use as compensatory stream mitigation in accordance with all applicable requirements.

A modified version of the Little Rock District Stream Method was used to calculate the number of credits available for preservation of 5.5 acres (1400 linear feet) of riparian corridor along the Maries River. This method is continually developing and credits will be reassessed when the assessment method is finalized. MoDOT will submit an impact assessment worksheet for each permit application or for each acre of impacted wetland or foot of impacted stream habitat that mitigation is proposed for this Bank the USACE will require the average number of credits per acre or foot for the bank.

A modified version of the Charleston Method was used to calculate the number of credits available for 28.7 acres of the Bank site. These 28.7 acres are comprised of 16 acres PEM, 5.2 acres PFO, and 7.5 acres of wetland buffer. Further, the creation worksheet was used to calculate the number of credits based on non-hydric soil units and the enhancement/restoration worksheet was used to calculate the number of credits based on hydric soil units. The PEM component containing hydric soil consists of approximately 5.3 acres of the 28.7-acre total. The non-hydric soil component consists of 10.7 acres, 7.5 acres, and 5.2 acres for PEM, wetland buffer and PFO, respectively. This method is continually developing and credits will be reassessed when the assessment method is finalized. MoDOT will submit an impact assessment worksheet for each permit application detailing each acre of impacted wetland or foot of impacted stream habitat proposed for mitigation at the Bank site. The USACE will require MoDOT to calculate the average number of credits per acre or per foot for the Bank.

<table>
<tr><td rowspan="6">34.2 acre site</td><td rowspan="5">28.7 acres wetland area w/ Charleston Method (Hydric vs non-Hyrdric)</td><td>2.8 ac PFO mounds (non-Hydric Soil)</td><td></td></tr>
<tr><td>2.4 ac PFO riparian (Non-Hydric Soil)</td><td></td></tr>
<tr><td rowspan="2">16 ac PEM</td><td>5.3 ac PEM (Hydric Soil)</td></tr>
<tr><td>10.7 ac PEM (Non-Hydric Soil)</td></tr>
<tr><td rowspan="2">7.5 ac Wetland Buffer</td><td>4.7 ac Wetland Buffer (Hydric Soil)</td></tr>
<tr><td>2.8 ac Wetland Buffer (Non-Hydric Soil)</td></tr>
<tr><td>5.5 acres Stream Method</td><td colspan="2"></td></tr>
</table>

<table>
<tr><td rowspan="4">18.7 ac (non-Hydric Soil)</td><td>2.8 ac PFO mounds</td></tr>
<tr><td>2.4 ac PFO riparian</td></tr>
<tr><td>2.8 ac Wetland Buffer</td></tr>
<tr><td>10.7 ac PEM</td></tr>
</table>

The final number of credits available using the Charleston Method is 45.55 wetland credits (Worksheet 1). There is 5,180 credits available based on the Little Rock District Stream Method at a rate of 942 credits per acre (Worksheet 2).

The credits generated by this Bank shall be used as compensatory mitigation for unavoidable and adverse environmental impacts to wetland and aquatic resources of the United States and where legal requirements apply to other natural resources, as these impacts result from public transportation projects constructed by MoDOT.

The number of credits required as compensatory mitigation for a specific project shall be determined by the USACE in accordance with existing federal guidance on mitigation when the USACE permit is issued. MoDOT will submit an impact assessment worksheet for impacts proposed to be mitigated to the Bank. The current guidance, upon which the USACE compensatory mitigation requirement would be based, includes the Memorandum of Agreement between the EPA and the USACE concerning the Determination of Mitigation Under the Clean Water Act, Section 404 (b)(1) Guidelines (February 6, 1990) and the Federal Guidance for the Establishment, Use, Operation of Mitigation Banks (60 F.R. 58605 *et seq.*).

The accounting ledger for the Bank is found in Table 2. An example project is shown on the ledger. Bank debits will also be tracked by wetland type for future reference in subsequent Banks.

G. Mitigation Banking Review Team (MBRT): Whereas, the MBRT member will consist of representatives from:

- USACE, Kansas City District (Chair)
- USACE, Kansas City District, Truman Satellite Office
- USACE, Kansas City District, Missouri State Regulatory Office

- EPA, Region VII, Kansas City
- FWS, Columbia Field Office
- FHWA, Jefferson City Office
- MDC, Jefferson City
- MDNR, Jefferson City

H. Disclaimer: Whereas, this BDP does not, in any manner, affect statutory authorities and responsibilities of the signatory parties. Furthermore, endorsement by the signatory parties of these policies and procedures does not set a precedent for future Banking projects.

II. AUTHORITIES

The establishment, use, operation, and maintenance of the Bank will be carried our in accordance with the authorities listed in the UI.

III. ESTABLISHMENT OF THE BANK

A. Sponsor Agreements: MoDOT agrees to perform all necessary work, in accordance with the provisions of this BDP, to establish and maintain 24 acres of wetland and 10.2 acres of riparian habitat. MoDOT agrees to perform this work until it is demonstrated to the satisfaction of the agencies represented on the MBRT (acting through the Chair) that the project complies with all conditions contained herein or until all credits are debited, whichever is later. As agreed by USACE and FHWA, the financial assurance for MoDOT Bank proposals shall be the assurance that FHWA "will take appropriate administrative action, within the legal authority of the agency, to ensure that wetland mitigation commitments established to compensate for wetland impacts due to Federal-aid highway projects are completed or achieved".

As originally agreed upon by the signatory agencies for the federal guidance on Banking, the Sponsor's financial assurance for public transportation bank proposals shall be the assurance that the purchase, construction, monitoring, and maintenance of the Bank shall be carried out as described in the BDP and attached documents. The Sponsor has already purchased the Bank property.

The Sponsor shall record a conservation easement or deed restriction on the Bank land prior to certification of any credits. The Sponsor will hold the deed restriction. The deed restriction shall preserve the Bank as wetlands and wildlife habitat in perpetuity. A deed restriction is currently being developed for the site.

B. Environmental Documentation: The Sponsor will obtain all appropriate environmental documentation, permits, or other authorizations needed to establish and maintain the Bank. This Development Plan does not fulfill or substitute for such authorization. A Wetland Delineation Report and NRCS Delineation Report are found in Figure D. Section 106 and protected species clearances are found in the following paragraphs (Attachment 1).

Section 106
In accordance with Section 106 of the National Historic Preservation Act, on May 28, 2002, the State Historic Preservation Officer (SHPO) provided written concurrence that one site within the proposed bank area was identified as having sparse, prehistoric evidence. They also concurred that the site will not be adversely affected because the testing has demonstrated there is no integrity in the impacted site (Attachment 1). In addition, because the project has been redesigned to avoid the site in question. The SHPO concurs that there will be no historic properties affected by the project. MoDOT's Cultural

Resources Section conducted a Phase I cultural resources survey on the proposed Bank site in 2002. It was concluded that one archaeological site within the project limits was identified, however, the proposed project has been designed to avoid the site, and therefore no historic properties will be affected by the project.

MoDOT personnel contacted the Osage Nation, via telephone, on December 3, 2002. The Osage tribe conveyed two requests regarding the project. They requested that MoDOT contact them if any human remains are encountered, or if we identify a National Register of Historic Places (NRHP) eligible archaeological site that will be adversely affected by the proposed project. Therefore, there are no NRHP eligible sites, but if a site is found all work will stop and the SHPO will be contacted.

Protected Species Clearance
The Missouri Natural Heritage Database was queried for the presence of federal or state-protected species. No protected species were listed in that query for the Bank site location. It is unlikely that any listed species of concern would be using the site because it was formerly cultivated cropland.

C. Sponsor Performance and Modifications: Credits shall become available in accordance with the schedule specified in Section IV.G of the UI and as described in the BDP and Provisions for Bank Closure.

D. Real Estate Provisions: MoDOT will provide a deed restriction on the Bank property prior to certification of any credits in favor of the Sponsor or its successor. The deed restriction preserves the Bank as wetlands and wildlife habitat in perpetuity.

E. As-Built Report: MoDOT agrees to submit an as-built report within 90 days following completion of construction or approved modification of a Bank. The as-built report for the original construction will describe in detail any deviation from that described in a BDP and include drawings showing finish grades and completed planting scheme.

IV. OPERATION OF THE BANK

A. Service Area: The Bank is established to provide mitigation to compensate for impacts to the waters of the United States, including wetlands, within the regulatory jurisdiction of the USACE, Kansas City District, as shown in Figure B. The service area and mitigation ratios are to be established according to the guidance already established within the UI.

The service area for this BDP is number seven, as outlined in the UI. The primary service area of the Bank consists of that portion of the Osage River Basin designated as Ozark/Osage Ecological Drainage Unit (EDU) (Maries River, Tavern Creek, Saline Creek, Lake Ozark, Niangua River, Grand Auglaize Creek, Gravois Creek, Pomme de Terre River, Osage River, Sac River, Cedar Creek, Turnback Creek) in MDC's Aquatic Gap Analysis Pilot Project. Aquatic Ecological System type called Tavern Creek. Bank credits will generally be authorized for use within the Osage River EDU, but may be authorized in the same larger Aquatic Subregion on a case-by-case basis as outlined in the UI, including the following areas:

Within the Kansas City District, Truman Satellite Office regulatory boundaries: Polk, Hickory, Camden, Dallas, and portions of Greene, Webster, Laclede, Pulaski, Lawrence, Dade, Cedar, St. Clair, Benton, Morgan, Christian, Barton, Vernon and Miller Counties;

Within the Kansas City District, State Regulatory Office regulatory boundaries: portions of Cole, Osage, and Maries Counties.

Examples of Sponsor projects that could be included in the Bank through the Banking process:

- Route 50 improvements (from Taos-Cole County, to Franklin County; from Jefferson City to Sedalia)
- Route 54 improvements (just south of Jefferson City-Cole County, to El Dorado Springs-Cedar County)
- Route 17 improvements (from Crocker-Pulaski County, to just north of Eugene-Cole County)
- Route 5 improvements (from Morgan County to Lebanon-Laclede County)
- Route 63 improvements (within Osage and Maries Counties)
- Route 65 improvements (from Springfield-Greene County, to north of Lincoln-Benton County)
- Route 13 improvements (from Springfield-Greene County, to just north of Lowry City-St. Clair County)
- Route 160 improvements (within the jurisdiction of Kansas City District)
- Interstate 44 improvements (within the jurisdiction of Kansas City District)

B. Sponsor Responsibilities: See UI.

C. Project Eligibility: See UI.

D. Project Ineligibility: The permitting USACE District will make decisions about the appropriate compensatory mitigation for impacts of a specific project on a case-by-case basis, during evaluation of any permit application. The permitting USACE District may determine during the public interest review or through coordination with the MBRT that compensatory mitigation through use of credits from a Bank may be inappropriate for some projects. Likewise, signatories recognize that the USACE District can review any proposed project and determine that another form of compensatory mitigation is ecologically preferable because of case-specific circumstances.

E. Success Criteria: MoDOT will be responsible for site construction; soil amendments; seeding; preliminary tree planting; Bank site management including weed control, structure maintenance and tree irrigation. The following criteria will be used to assess project success in addition to that contained within the UI:

1. Financial Success Criteria: See UI.

2. Hydrologic Success Criteria: See UI.

3. Initial Vegetative Success Criteria: The initial vegetative success criteria for areas planted in trees grown by the RPM^{TM} is the survival of 50 stems per acre. A predominance of hydrophytic herbaceous ground cover is also required under this planting method.

4. Long-term Vegetative Success Criteria: In general, the portion of a Bank planned to be wetlands must meet the vegetative criteria for wetlands as outlined in the 1987 Wetland Delineation Manual and at least 80 percent of the vegetative cover should be desirable plants suitable for the Bank's water regime and site potential. The long-term vegetative success criteria are maintaining stem density of desirable woody species at 50 to 175 trees per acre, with sufficient height, diameter at breast height (dbh), or basal area to allow temporary growing season inundation and overall maturation of the tree stand. Desirable species are those native to the eco-region of the Bank. Undesirable species shall be kept to a minimum within the Bank.

A list of undesirable species, including noxious and invasive species, and allowable percentages of these species is found in Table 3.

5. Soils Success: See UI.

6. Subsequent Growing Seasons – Subject to monitoring report recommendations and Chair approval, MoDOT will replant trees in order to meet success criteria requirements. This restocking will occur whenever needed in years one through three after Bank establishment or until the USACE certifies that hydrology and vegetation criteria have been met and all credits are available for use, whichever is the greater length of time.

F. Debit/Credit Assessment: The same method will be used to assess both credits and debits. The number of credits available at the Bank is 45.55. Of this total, 31.66 credits are classified as restoration/enhancement and the remaining 13.89 credits are classified as creation. The total acres in the bank will be 28.7. When credits are used, both the number of credits and acres consumed are calculated and recorded. When all 28.7 acres have been consumed, no more credits may be used from the bank.

The stream bank riparian buffer will be credited at a rate of 942 credits for one acre of stream impact.

G. Functional Analysis: Modified versions of the Charleston Method and the Little Rock District Stream Method were both used to determine the functional assessment and credits per acre for the Bank site. The MBRT will reassess the number of credits when assessment methods are finalized.

H. Schedule of Credit Availability: Upon submittal of all appropriate documentation by MoDOT and subsequent approval by the USACE, in consultation with the other members of the MBRT, it is agreed that credits will become available for use by the Sponsor or for transfer to a third party in accordance with the schedule outlined in the UI.

1. Initially, 10 percent of total anticipated credits shall be available for debiting immediately after the MBRT's approval of a BDP and MoDOT has achieved financial success, as described in Section IV.F of the UI.

2. An additional 15 percent of total anticipated credits shall be available for debiting immediately after submittal and approval of the as-built report.

3. An additional 25 percent of total anticipated credits shall be available for debiting following demonstration of meeting hydrological success, as described in Section IV.F of this instrument and the applicable BDP. The number of credits released will be based on the proportion of proposed wetlands meeting the hydrology success criteria.

4. The remaining 50 percent of total anticipated credits shall be made available by the Chair USACE District for withdrawal when the vegetative and soils success criteria as described in Section IV.F of the UI. If a portion of the individual Bank does not meet the hydrologic, vegetative, or soil success criteria, the equivalent credit for the area that does not meet the criteria will not be available for debiting until the criteria are achieved.

I. Credit Utilization: See UI.

J. Site Use Provisions: An existing road is in place on the western side of the proposed Bank for utility maintenance (Photograph 2). All others, see UI.

K. Bank Closure: Bank closure will occur when all MBRT – approved credits generated from this site have been debited by MoDOT, or earlier at MoDOT's request. Subsequent to Bank closure, management will remain the responsibility of MoDOT. Management decisions after Bank closure shall always be made with the primary goals of maintaining healthy timber and the wetland functions for which the site was originally designed. See UI.

V. MAINTENANCE AND MONITORING OF THE BANK

A. Accounting Procedures: See UI. See Table 2 for a sample ledger.

B. Maintenance Provisions: See UI.

C. Monitoring Provisions: See UI.

D. Reporting: See UI.

E. Contingency Plans/Remedial Actions: The proposed maintenance facility is located on the furthest southwest corner of the property. The maintenance facility runoff will not enter the Bank site. There is an existing drainage ditch and pond that will capture any runoff from the facility site and channel it into the Maries River (Photograph 2). The drainage ditches run just to the south of the road and berms and discharges into the Maries River on the west side of the existing mitigation area.

F. Long-Term Management: See UI.

VI. RESPONSIBILITIES OF THE MBRT

A. Agency Oversight: See UI.

B. Agency Review: See UI.

C. Credit Approval: See UI.

D. Compliance Inspections: See UI.

VI. OTHER PROVISIONS

A. Force Majeure: See UI.

B. Dispute Resolution: See UI.

C. Validity, Modification, and Termination of the Development Plan: See UI.

D. Controlling Language: See UI.

MBRT CONCURRENCE

Margaret Stockdale
Watershed Planning and Implementation Branch
US Environmental Protection Agency, Region VII

8-28-06
Date

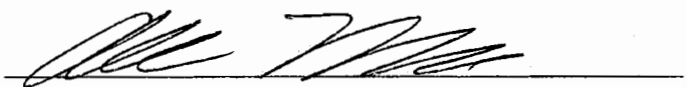
MBRT CONCURRENCE

Rick L. Hansen

for Charles Scott
Field Supervisor
US Fish & Wildlife Service

15 September 2006
Date

MBRT CONCURRENCE



9-21-06

Allen Masuda
Division Administrator, Missouri Division
Federal Highway Administration

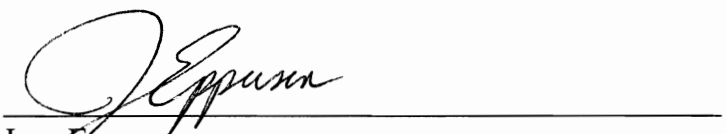
Date

MBRT CONCURRENCE

for Daniel Schuette, Director
Division of Environmental Quality
Missouri Department of Natural Resources

8/25/06
Date

MBRT CONCURRENCE



8/2/06

Jane Epperson
Policy Supervisor, Missouri Department of Conservation

Date

FOR MISSOURI DEPARTMENT OF TRANSPORTATION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

By _____

Title Director of Program Delivery

ATTEST:

_____
Secretary to the Commission

Approved as to Form:

_____
Commission Counsel

APPENDIX

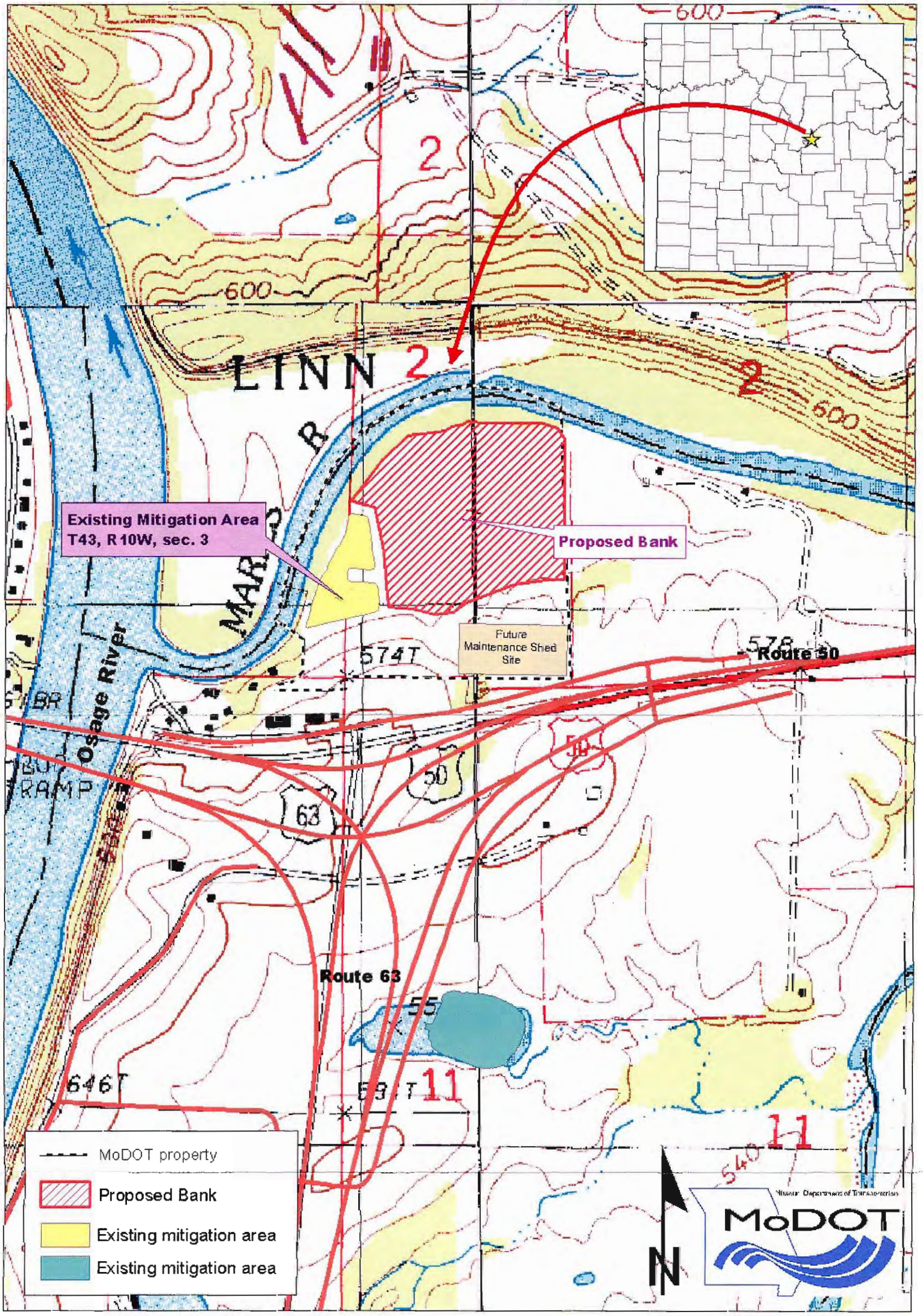


Figure A. MoDOT Mari-Osa Delta Region Mitigation Bank, Osage County, Missouri, location map.

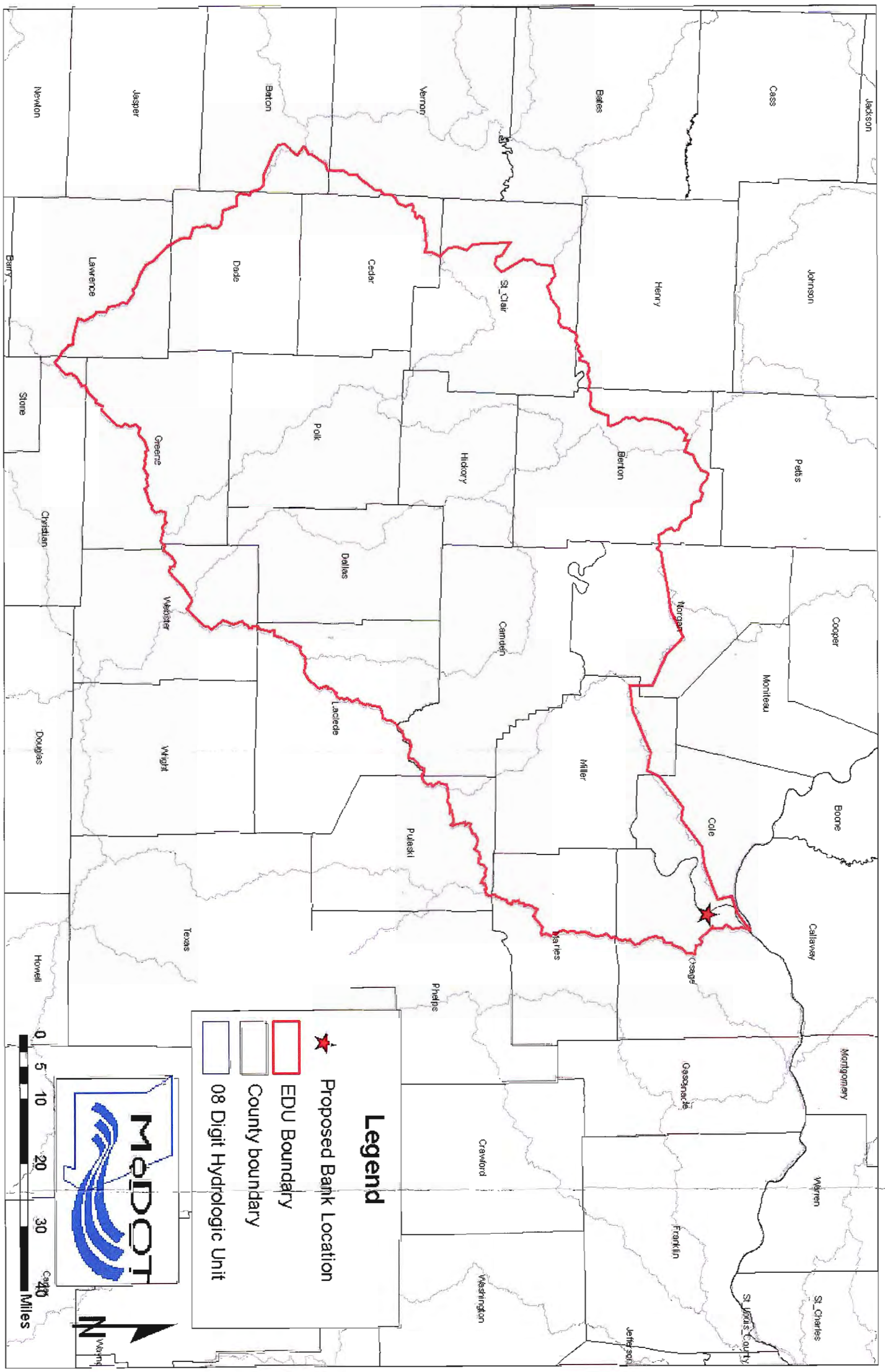


Figure B. Mitigation Bank Service Area Boundary.

ROUTE	STATE	DISTRICT	SHEET NO.
50	MO	5	3
JOB NO.	J5P0879		
CONTRACT ID.			
PROJECT NO.			
COUNTY	OSAGE		DATE

LEGEND

Existing Tree
(Do Not Disturb
Within 20' of Drip Edge)

Hard Mast Trees
3gal. pots
20' x 20' Spacing

Seed With
Switch Grass,
Red Top and
Perennial Rye

Rock Berm to Dissipate
Water Flow and Create
Sheet/Water Flow.

Existing Drainage F.L.
(Widen to Variable Width
Flat Bottom Swale)
(10:1 Side Slopes)

Variable Width
Flat Bottom Swale
(10:1 Side Slopes)

Type II Ditch Check

1' Berm
Inside The Tree Line
Of The Existing Trees
(SIDE OF TREE LINE OPPOSITE
OF MARIES RIVER)

Hard Mast Trees
20' x 20' Spacing
(Outside of Drip Edge of
Existing Timber Line)

46' - 18" SDR35 PIPE

7' INLINE WATER
LEVEL CONTROL
STRUCTURE

31' - 18" SDR35 PIPE

BERM

EXISTING

℄ STA 0+00.00 =
EXISTING CONSTRUCTION LINE
STA. 6+29.96

STA 12+25.65

STA 7+84.88

EXISTING CONSTRUCTION LINE

EXISTING CONSTRUCTION LINE
N 85° 21' 06.8" E

STA 21+93.83

Existing Berm
(U.I.P.)

EXCAVATE ADDITIONAL
12" - To Elev. 533

Existing Tree
NO FILL
(In this area)

Existing Tree
NO FILL
(In this area)

NO FILL
(In this area)

℄
N 90° 00' 00" E

POT STA 12+88.10

EXISTING CONSTRUCTION LINE
N 43° 06' 48.9" E

STA 1+75
140' RT.
TYPE II DITCH CHECK

STA 0+00.00

STA 4+44.64
597.34' RT.
34.15°

40' GROUP C PIPE
SET AT ELEV. 540.5'

OUTER ROAD

P PIPE

One Row of Shrubs
Around Swale Area
Swale Elev. 533.00

Area Above Elev. 535'
At This Location Shall
Not Be Disturbed Over
12" In Depth.

(LEFT SECTION)
Construct Variable
Width Flat Bottom
Swale Beginning At
Elev. 534.5' to
Existing Elev. 534.0'
(10:1 Side Slopes)

Ditch Block.
Divert and Block
Flow of Existing
Ditch.

Excavate Berm
(80') on West
Side of Existing
Drainage Dicth.
Diverting Flow
Into Site.
Rock Lined Outlet.
Use TPYE II DITCH LINER

Sta. 12+25
Rt. 250'

Rock Berm to Dissipate
Water Flow and Create
Sheet/Water Flow.
(1' High)

(CENTER SECTION)
Existing Area
Drainage Flow Line
(Widen Existing Flow Line)

Entrance to Site.
(Entrance shall act
as a lined ditch to
direct rain water run
on to the Site)
Use TYPE I DICH LINER

Sta. 12+40
Rt. 630'

(RIGHT SECTION)
Construct Variable
Width Flat Bottom
Swale Beginning At
Elev. 534.5' to
Existing Elev. 534.0'
(10:1 Side Slopes)

PROPOSED
WETLANDS SITE @ MARIES RIVER
OSAGE COUNTY

SHEET 1 OF 1

REV.

J:\projects\dist5\Osage 50 5P0879 MariOsa\microstation\6-14-06\003_J5P0879plan_wetland.dgn 07:49:59 AM 07/25/2006

Figure C: MoDOT Mari-Osa Delta Region Mitigation Bank Site Plan.

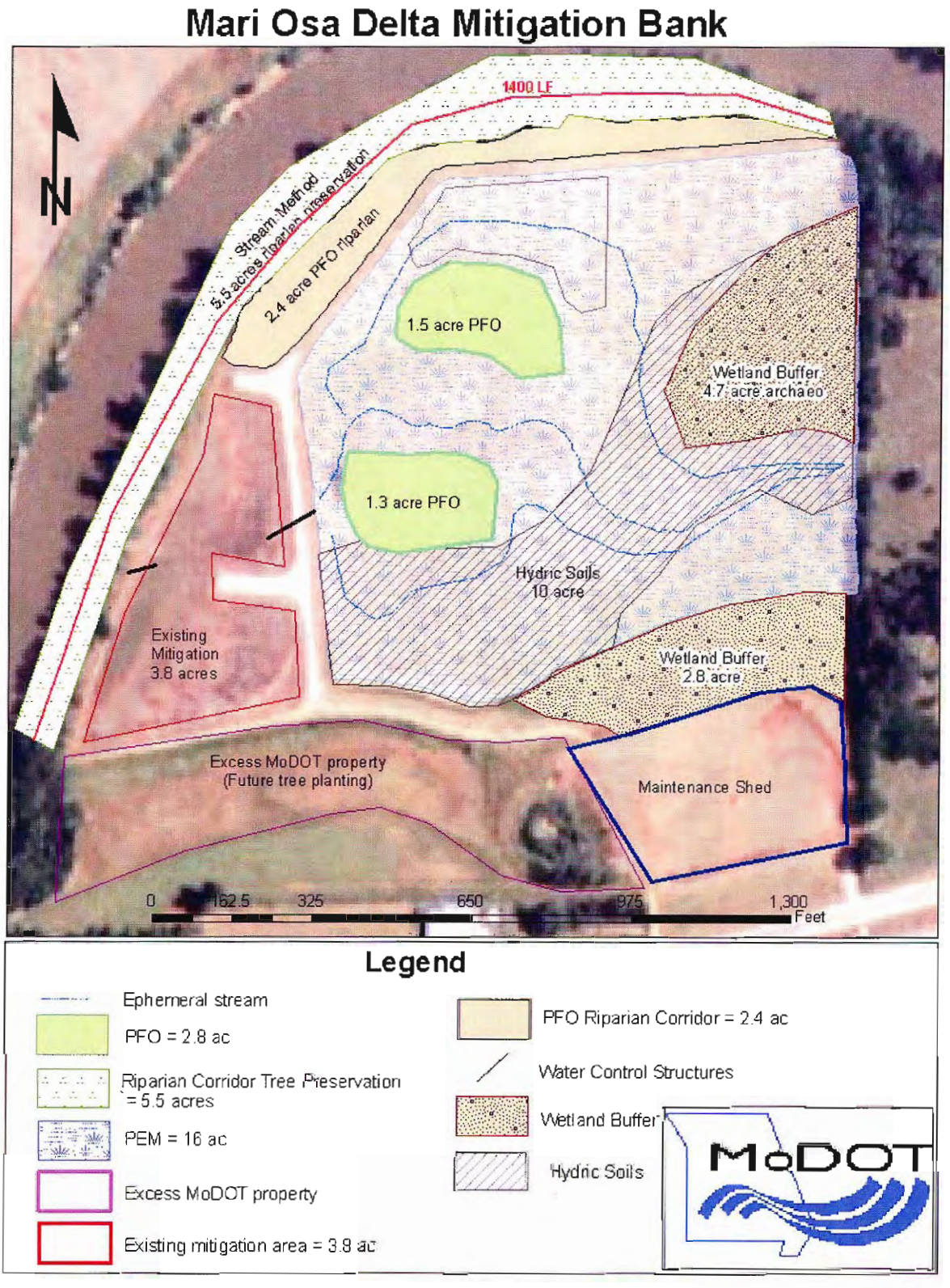


Figure D: Functional Assessment Breakdown.

Figure E. NRCS Delineation and Food Security Act (FSA) Wetland Inventory Map.

United States Department of Agriculture
Natural Resources Conservation Service
Fulton Field Office
4549 State Road H
Fulton, MO 65251
(573) 592-1400

June 18, 1999

MoDOT
Tom Mings
105 West Capitol Avenue
P.O. Box 270
Jefferson City, MO 65102

Subject: Job No. J5P0344B
Cole/Osage Counties, Routes 50/63

Dear Sir:

On 6/18/99, in response to a request from MoDOT, I performed a certified wetland delineation on the ag land on F #2498, T #3923 in Osage County, Missouri. I contacted our hydrologic engineer and determined that this area was above the 15-day flood duration elevation. I reviewed, along with you, all of the slides that Osage County FSA had, in addition to the normal years' slides that Cole County had sent over for that area.

We determined that none of the ag land had a wetland signature in over half of the normal years. Our on-site visit confirmed that this area consisted of 23.5 acres of PC, prior converted cropland, and the rest of the ag land was NW, non-wetland. None of the PC was a concave depression, without drainage, that would allow it to pond water for 15 days.

The attached maps shows the areas of PC, prior converted, and NW, non-wetland, on this tract. The non-ag was NI, non-inventoried. Please call me at (573) 592-1400 if you have any questions, or need any other information.

Sincerely,

John L Baker

JOHN L. BAKER
Wetland Team Leader

Enclosures

cc: Mark Frazier, COE, Kansas City, MO
Steve Solada, MoDOT, Jefferson City, MO
Terry Cosby, ASTC, NRCS, Jefferson City, MO
James Hunt, DC, NRCS, Linn, MO


F 2498
T 3978
MoDOT
Job No. J5P0344B
Cole / Osage
Rts. 50/63
NHEL
CRP 2009
T-3822
NW
NHEL
PC
13.5
2374
T3844
NHEL
14.0
NHEL
11.5
2375
T3845
PC = 23.5
NW
2370
T-3970
NHEL

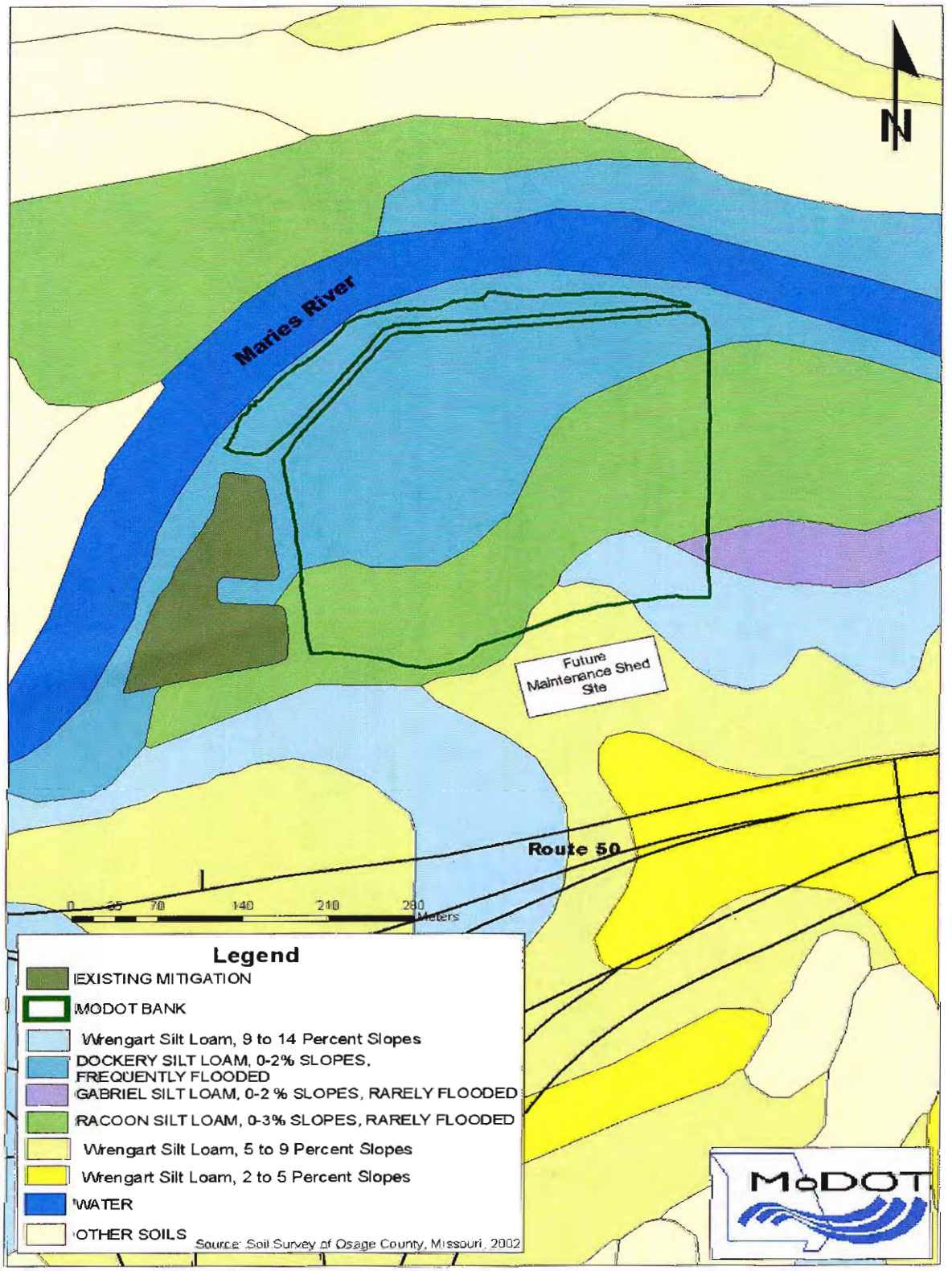


Figure F. Soils Map.

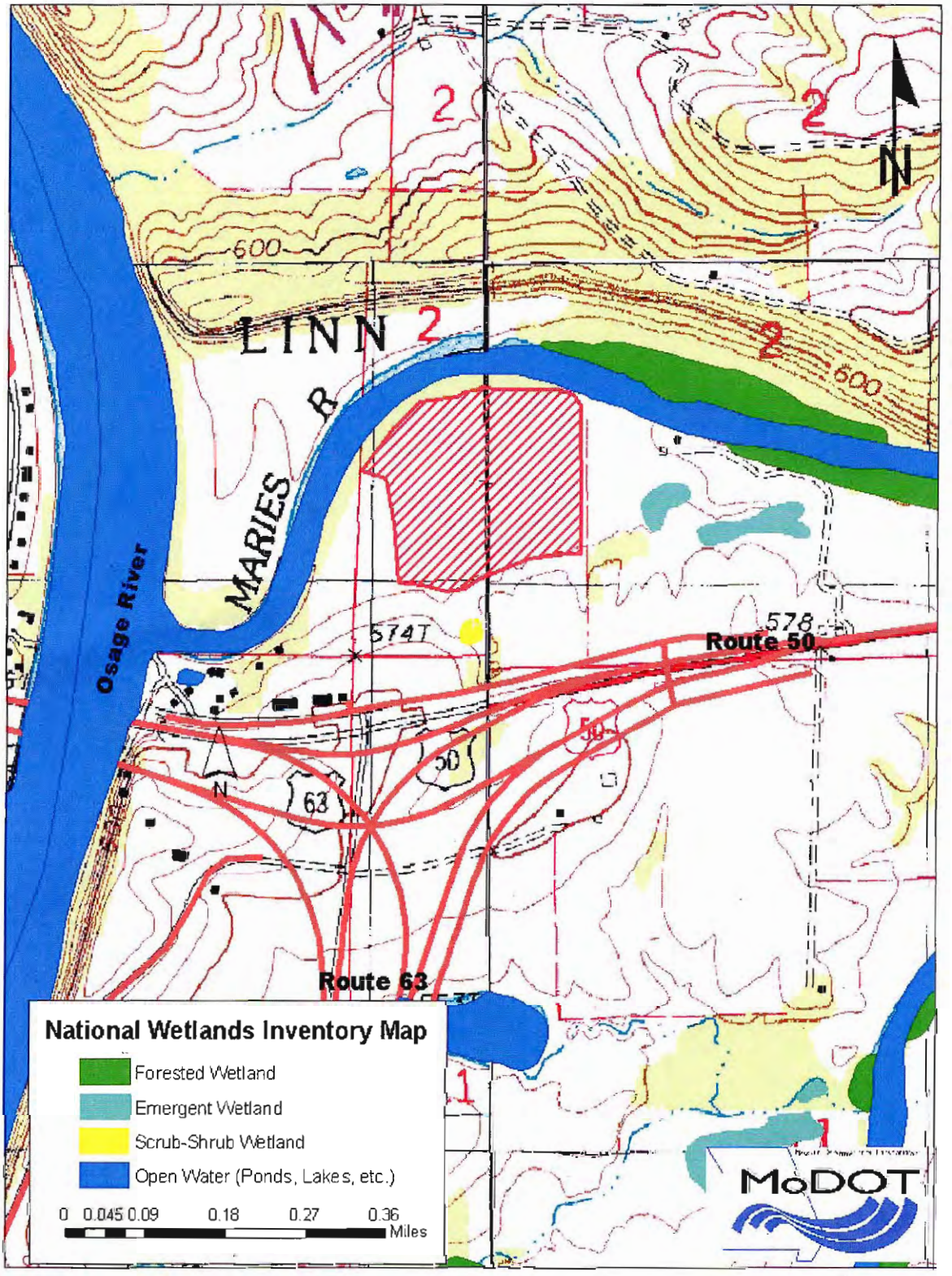
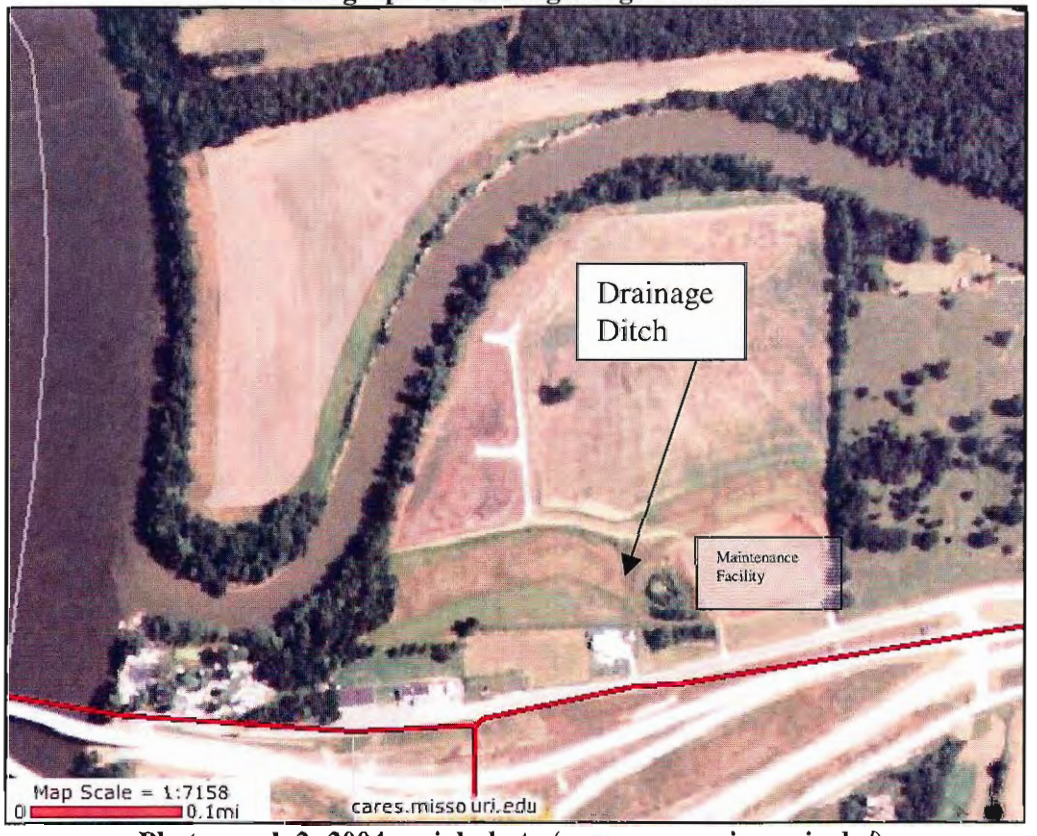


Figure G. National Wetlands Inventory Map.

PHOTOGRAPHS

Photograph 1: Existing mitigation area.



Photograph 2: 2004 aerial photo (www.cares.missouri.edu/).

Attachment 1. SHPO Letter.

CR file

STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

May 28, 2002

Ms. Diane Heckemeyer
State Design Engineer, Missouri Department of Transportation
601 West Main Street / P.O. Box 270
Jefferson City, MO 65102

Re: SHPO Project Number 015-CO-02 - Job No. J5P0780 proposed Mari-Osa-Delta wetlands mitigation area in Osage County, Missouri (FHWA)

Dear Ms. Heckemeyer:

Thank you for submitting information about the above-referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of cultural resources.

After reviewing the information provided we find the report to be adequate. We concur that site 23OS45 will not be adversely effected by the project because the testing has demonstrated there is no integrity in the portion of the site that will be impacted. In addition, because the project has been redesigned to avoid site 23OS45 we concur that there will be **no historic properties affected** by the project.

Please be advised that, if the project area is increased, cultural materials are encountered during construction or adjacent areas that may contain significant cultural resources may be adversely impacted, appropriate information must be provided to this office for further review and comment.

If you have any questions please write or call Brant Vollman at (573) 526-1680. Please be sure to include the SHPO **Project Number (015-CO-02)** on all future correspondence relating to this project. If the information is provided via telephone call, please follow up in writing for our files.

Sincerely,

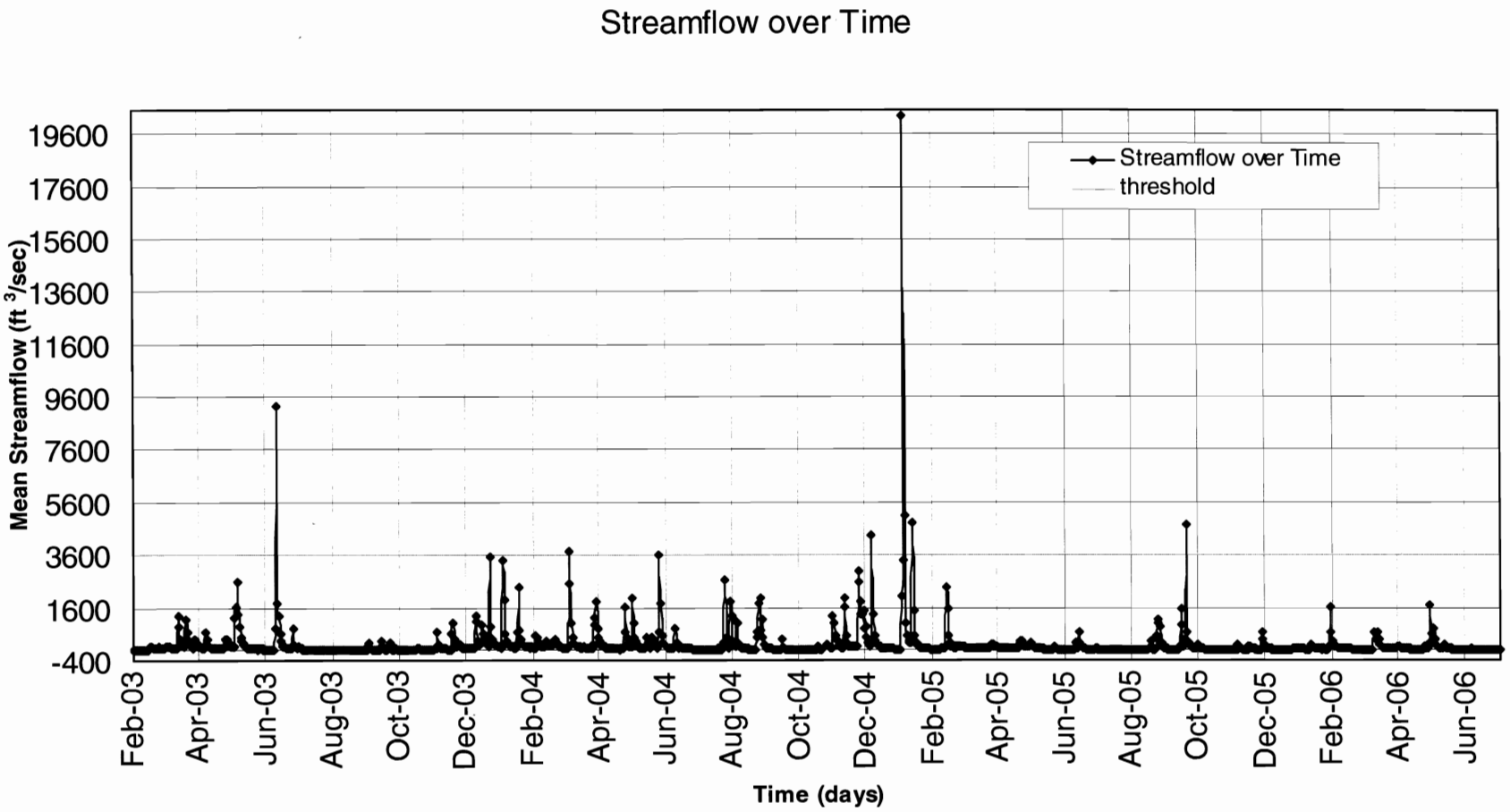
STATE HISTORIC PRESERVATION OFFICE

Claire F. Blackwell
Director and Deputy State
Historic Preservation Officer

CFB: bv

c. Mr. Stephen Mahfood, Missouri Department of Natural Resources
Ms. Sara Parker, Missouri Department of Natural Resources
Mr. Don Neumann, Federal Highway Administration
Dr. Bob Reeder, Missouri Department of Transportation
Mr. John Howland, Missouri Department of Transportation

RECEIVED
CULTURAL RESOURCES
MAY 31 2002
MO HIGHWAY & TRANSPORTATION DEPT.



Graph 1: Mean streamflow in cubic feet per second on the Maries River at Westphalia, Missouri. The red line indicates when the Maries River comes out of its banks at the bank site.

Table 1. Existing Vegetation.

Common Name	Scientific Name	Indicator Status
Golenrod	*Solidago sp.*	FACU
Great ragweed	*Ambrosia trifida*	FAC+
Switchgrass	*Panicum virgatum*	FAC+
Sumpweed	*Iva annua*	FAC
Little white aster	*Aster sp.*	UNK
Broomsedge	*Andropogon virginicus*	FAC-
Foxtail	*Setaria faberi*	FACU+
Johnsongrass	*Sorghum halepense*	FACU
Curleydock	*Rumex crispus*	FAC+
Eastern red cedar	*Juniperus virginiana*	FACU
Mare's tail	*Conyza Canadensis*	FAC-
Grass	*Panicum sp.*	UNK
Sedge (sparse)	*Carex sp.*	UNK
Smartweed	*Pologonum sp.*	UNK
Cottonwood saplings	*Populus deltoids*	FAC+
Flatsedge	*Cyperus sp.*	UNK
Fescue	*Festuca sp.*	FACU+

Table 2. MoDOT Mari-Osa Delta Region Mitigation Bank Site Account Ledger.

MoDOT Mitigation Banking Ledger														
	Mari-Osa Delta Region													
Service Area	Osage River										Anticipated Wetland Credits			45.55
Chair Corps District	Kansas City District										Anticipated Stream Credits			5180
Mitigated Impact Information								Wetland Mitigation			Stream Mitigation			
Date	Permitting Corps District	CE Permit Number	Project or Action Description (Route and MoDOT project number for projects, Success criteria for credit release)	EDU	Aquatic Resource Type	Impact Size	Credits Needed	Credits Deposited	Credits Debited	Credits Remaining	Credits Deposited	Credits Debited	Credits Remaining	
1-Aug-06	Kansas City		BDP was approved					4.55		**4.55**	518.0		**518.0**	
10-Aug-06	Kansas City	200600919	MO 50 West	5	PEM/PUB	0.6	3.1		3.1	**1.5**		518.0	**0.0**	

Table 3. State of Missouri Noxious Weed List.

Scientific Name	Noxious Common Name	State Noxious Status	Allowable Percentage (%)
Cannabis sativa L.	marijuana	Noxious weed	0
Carduus nutans L.	musk thistle	Noxious weed	2
Cirsium arvense (L.) Scop.	Canada thistle	Noxious weed	2
Convolvulus arvensis L.	field bindweed	Noxious weed	2
Dipsacus fullonum L.	common teasel	Noxious weed	2
Dipsacus laciniatus L.	cut-leaved teasel	Noxious weed	2
Lythrum salicaria L.	purple loosestrife	Noxious weed	0
Onopordum acanthium L.	Scotch thistle	Noxious weed	2
Pueraria lobata (Willd.) Ohwi	kudzu	Noxious weed	0
Rosa multiflora Thunb. ex Murr.	multiflora rose	Noxious weed	2
**Sorghum halepense (L.) Pers.*	johnsongrass	Noxious weed	20

* Johnsongrass is listed as a noxious weed in 19 counties in the State; Osage County is not one of them.

Worksheet 1. Charleston Method Worksheet

Creation Mitigation Worksheet

Factors	Area 1	Area 2	Area 3
Vegetation	0.4	0.1	0.4
Soil	0.4	0.4	0.4
Control	0.1	0.1	0.1
Temporal Lag	-0.2	0	-0.2
Credit Schedule	0.1	0.1	0.1
Kind			
Location			
Sum of m Factors	$M_1 = 0.8$	$M_1 = 0.7$	$M_1 = 0.8$
Mitigation Area	$A_1 = 5.2$ (PFO)	$A_1 = 10.7$ (PEM)	$A_1 = 2.8$ (BUFF)
M x A =	4.16	7.49	2.24

Credits = E(MxA) = **13.89**

Restoration or Enhancement Mitigation Worksheet

Factors	Area 1	Area 2
Net Improvement	4.0	2.0
Control	0.1	0.1
Temporal Lag	0	-0.2
Credit Schedule	0.1	0.1
Kind		
Location		
Sum of m Factors	$M_1 = 4.2$	$M_1 = 2.0$
Mitigation Area	$A_1 = 5.3$ (PEM)	$A_1 = 4.7$ (BUFF)
M x A =	22.26	9.4

Credits = E(MxA) = **31.66**

Variable Credits Bank Summary

Area	Credits	Acres
PFO	4.16	5.2
PEM	7.49	10.7
PEM	22.26	5.3
BUFF	11.64	7.5
Grand Totals	45.55	28.7

The number of credits the bank may be able to use is 45.55. Of this total, 31.66 credits are classified as restoration/enhancement and the remaining 13.89 credits are classified as creation.

The total acres in the bank will be 28.7. When credits are used, both the number of credits and acres consumed are calculated and recorded. When all 28.7 acres have been consumed, no more credits may be used from the bank.

Worksheet 2. Little Rock Stream Method Worksheet

RIPARIAN BUFFER CREATION, ENHANCEMENT, RESTORATION AND PRESERVATION WORKSHEET

Stream Type	Ephemeral 0.1	Intermittent 0.4	Perennial			
			<15' 0.8	15'-30' 1.0	30'-50' 1.2	>50' 1.4
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 0.4			
Riparian Benefit (for each side of stream)	Additional (select values from Table 1 times 1.2 multiplier)	Riparian Creation, Enhancement, Restoration, and Preservation Factors (select values from Table 1) (MBW = Minimum Buffer Width = 25' + 2' / 1% slope)				
System Protection Credit	Condition: MBW restored or protected on both streambanks To calculate: (Net Benefit Stream Site A + Net Benefit Stream Side B) / 2					
Stream Channel Restoration/Enhancement Benefit	Moderate 1.0	Good 2.0	Excellent 3.5			
Monitoring/Contingency (for each side of stream)	Level I 0.075	Level II 0.3	Level III 0.5			
Site Protection	No Covenant 0.075		Conservation Easement/Deed Restriction 0.3			

Factors		Net Benefit 1
Stream Type		1.4
Priority Area		0.4
Riparian Benefit	Stream Side A	0.3
	Stream Side B	0
System Protection Credit Condition Met (Buffer on both sides)		0
Stream Channel Restoration/Enhancement Benefit		1
Monitoring/Contingency	Stream Side A	0.3
	Stream Side B	0
Control	Stream Side A	0.3
	Stream Side B	0
Sum Factors (M) =		3.7
Linear Feet of Stream Buffer (LF) = (don't count each bank separately)		1400 preservation
Total Credits Generated C X LF =		5180

Total Riparian Restoration Credits Generated = <u>5180 credits</u>

Credits per acre = Total Credits/acres = 5180 credits/5.5 acres = <u>941.8 c/a</u>