



**US Army Corps  
of Engineers®**

# Special Public Notice

**Public Notice No: MVM-MGMR**

**Date: September 24, 2004**

Memphis District

Please address all comments to:  
Memphis District Corps of Engineers, Regulatory Branch  
167 N Main ST, RM B202, Memphis, TN 38103-1894

## PUBLIC NOTICE FOR MITIGATION GUIDELINES AND MONITORING REQUIREMENTS

The U.S. Army Corps of Engineers (Corps) and U.S. Environmental Protection Agency (EPA) regulations (33 CFR 320-330 and 40 CFR 230) authorize the Corps to require compensatory mitigation for unavoidable impacts to wetlands and other jurisdictional "waters of the U.S." Numerous reports, including the National Research Council's (NRC) report entitled "*Compensating for Wetland Losses Under the Clean Water Act*" have identified problems with the mitigation program, as it currently exists. The Corps is aware of these problems and is committed to improving the success of future compensatory mitigation projects.

The Corps and EPA have issued the National Wetlands Mitigation Action Plan to help address these concerns. As part of the Corps approach to implementing better compensatory mitigation, each Corps District has been tasked to publish new or revised Mitigation and Monitoring Guidelines.

On December 16, 2003, this office issued a public notice announcing the draft Mitigation Guidelines and Monitoring Requirements (MGMRs). Comments were received from various Federal, state and local agencies, organizations and individuals in response to the public notice. In consideration of these comments and available information, modifications to the draft MGMRs were incorporated into the final document, a copy of which is attached.

The attached MGMRs, in the form of a compensatory mitigation plan checklist and supplement, as well as a list of common terms and their definitions used when discussing wetland and stream regulations (attached as Attachment B), and Stream Description Information sheet (attached as Attachment C) are designed to assist the regulated public with all aspects of the mitigation process, improve the quality of design and implementation of compensatory mitigation projects, and ensure that future compensatory mitigation sites successfully replace functions and values of waters of the U.S. that are lost as a result of regulated impacts. Specific topics addressed within the MGMRs include the assessment of impacts to the aquatic environment, development of performance standards and success criteria, and establishing requirements for preparing monitoring reports for compensatory mitigation sites.

The MGMRs are to be applied by the regulated public and by Regulatory Branch project managers for activities within the Memphis District. The rationale is that these MGMRs, developed from previous guidelines, professional experience, field investigations, public input, and recommendations of the NRC, will improve the success of compensatory mitigation projects in the Memphis District. Please note, however, that depending on the size, location, and/or complexity of the mitigation proposal, additional information may be required to adequately assess the proposal.

The MGMRs, along with the attachments, may be used in other federal or state programs as well. However, additional information may be needed to satisfy specific program requirements. For example, Attachment A indicates additional information needed by the Natural Resources Conservation Service (NRCS) to satisfy the Swampbuster provisions of the Food Security Act.

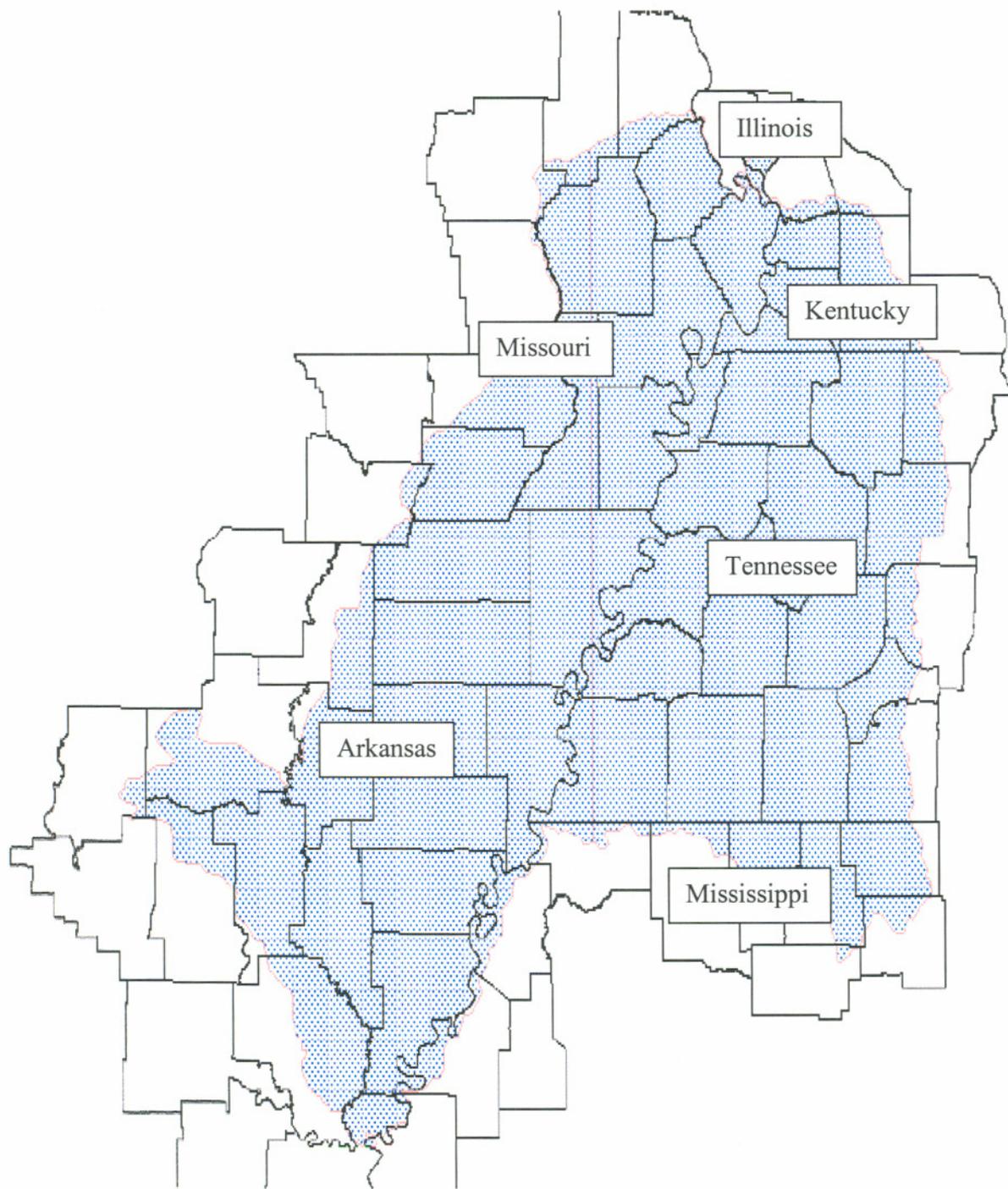
The Corps and the EPA formulated policy and procedures to be used in determining the mitigation necessary to demonstrate compliance with the Clean Water Act Section 404(b)(1) Guidelines (40 CFR 230) (the Section 404(b)(1) Guidelines). This information is set forth in the "Memorandum of Agreement (MOA) 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," dated February 7, 1990 (the Mitigation MOA). The Section 404(b)(1) Guidelines limit the issuance of a permit to the activity or project design representing the least environmentally damaging practicable alternative (LEDPA) that is not contrary to the public interest. More specifically, the Section 404(b)(1) Guidelines state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative available to the proposed discharge that would have less adverse impact on the aquatic ecosystem, if the alternative does not have other significant adverse environmental consequences. Practicability is defined in terms of cost, logistics, and existing technology in light of the overall project purpose. The burden to demonstrate compliance with the Section 404(b)(1) Guidelines rests with the permit applicant. For non-water dependent discharges into special aquatic sites, there is a presumption that less environmentally damaging practicable alternatives are available. If the applicant has complied with the Guidelines by first evaluating alternatives that would avoid impacts, and then taken appropriate and practicable steps to minimize adverse impacts to the maximum extent practicable, then compensatory mitigation is required for the unavoidable impacts. Even in cases where a Corps-notifying General Permit (Nationwide Permit or Regional General Permit pursuant to 33 CFR 330) applies; the applicant will have to demonstrate avoidance and minimization of aquatic resource impacts. Granted, the demonstration required is typically less rigorous than for a Standard Permit. Nevertheless, if an applicant is required to notify the Corps regarding authorization under an existing General Permit, it is likely that the Corps verification letter / notice to proceed will require compensatory mitigation. Clearly, the sequence of avoidance, minimization, and compensatory mitigation specified by the Section 404(b)(1) Guidelines and the Mitigation MOA is fundamental to the administration of the Corps' regulatory program.

The Memphis District MGMRs are subject to periodic review and modification with the development of improved wetland functional assessment methods and/or new technology.



Larry D. Watson  
Chief  
Regulatory Branch

Attachments



MEMPHIS DISTRICT CORPS OF ENGINEERS  
DISTRICT BOUNDARY

**MEMPHIS DISTRICT**  
**COMPENSATORY MITIGATION PLAN CHECKLIST<sup>1</sup>**

**1. Mitigation Goals and Objectives**

- Description of avoidance and minimization of impacts
- Description of functions lost at impact site
- Description of target functions to be gained at mitigation site
- Description of overall watershed improvements expected as a result of mitigation

**2. Baseline Information for Impact and Proposed Mitigation Sites**

- Appropriate location maps
- Description of existing soils, vegetation and hydrology of impact site
- Description of existing soils, vegetation and hydrology of proposed mitigation site
- Description of surrounding land uses

**3. Mitigation Work Plan**

- Proposed work schedule
- Construction / grading plans
- Description of plans for establishing wetland hydrology, hydrophytic vegetation and hydric soils within the proposed mitigation site

**4. Identify Performance Standard and Success Criteria of Mitigation Site**

- Proposed success criteria for establishment of wetland hydrology
- Proposed success criteria for establishment of hydrophytic vegetation
- Proposed success criteria for establishment of hydric soils
- Quantifiable parameters that can be used to assess success

**5. Monitoring Plan**

- Identities of party or parties responsible for monitoring
- Description of data to be collected
- Description of proposed reporting format
- Proposed monitoring schedule

**6. Remedial measures if success criteria not met**

- Identification of party or parties responsible for adaptive management
- Identification of potential challenges to mitigation site

**7. Site Protection**

- Identification of party or parties responsible for long-term site protection
- Copy of proposed legal protective measures
- Plans for long-term physical protection of site

**8. Financial Assurances (if applicable)**

- Identification of party or parties responsible for financial assurance of success
- Types of assurances
- Schedule for reviewing and adjusting financial assurances

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<sup>1</sup> Refer to "Supplement: Compensatory Mitigation Plan Checklist" for further explanation of specific checklist items.

## **SUPPLEMENT: COMPENSATORY MITIGATION PLAN CHECKLIST**

This document is intended as a technical guide for applicants<sup>2</sup> preparing compensatory mitigation plans for permits in the Memphis District, U.S. Army Corps of Engineers, under Section 404 of the Clean Water Act (CWA). Compensatory mitigation is required to offset unavoidable impacts. The purpose of this document is to identify the types and extent of information that agency personnel need to assess the likelihood of success of a mitigation proposal. Success is generally defined as: a healthy sustainable wetland/water that – to the extent practicable – compensates for the lost functions of the impacted water in an appropriate landscape/watershed position. This checklist provides a basic framework that will improve predictability and consistency in the development of mitigation plans for permit applicants. Although every mitigation plan may not need to include each specific item, applicants should address as many as possible and indicate, when appropriate, why a particular item was not included (For example, permit applicants who will be using a mitigation bank would not be expected to include detailed information regarding the proposed mitigation bank site since that information is included in the bank's enabling instrument).

The National Research Council (NRC) has identified 10 factors for improving the success of compensatory mitigation projects. These are grouped into two categories: *Basic Requirements for Success* and *Mitigation Site Selection*. The *Basic Requirements for Success* are as follows: (1) whenever possible, choose wetland restoration over creation; (2) avoid over-engineered structures in the wetland's design; (3) restore or develop naturally variable hydrological conditions; (4) consider complications associated with creation or restoration in seriously degraded or disturbed sites; and (5) conduct early monitoring as part of adaptive management. The NRC's recommendations for *Mitigation Site Selection* are as follows: (1) consider the hydrogeomorphic and ecological landscape and climate; (2) adopt a dynamic landscape perspective; (3) pay attention to subsurface conditions, including soil and sediment geochemistry and physics, groundwater quantity and quality, and infaunal communities; (4) pay particular attention to appropriate planting elevation, depth, soil type, and seasonal timing; and (5) provide appropriately heterogeneous topography. These recommendations have been incorporated into the attached mitigation plan checklist and supplement.

### **1. Mitigation Goals and Objectives**

#### **Impact Site**

- a. Describe attempts to avoid and minimize impacts to aquatic resources on the project site. Include a description of impacts to local hydrology, upstream and downstream aquatic resources, and wildlife habitat.
- b. Describe and quantify by acreage and/or linear feet the aquatic resource type and functions that will be impacted at the proposed project site. Include a description of temporary and permanent impacts to the aquatic environment.

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<sup>2</sup> The checklist may be used in other federal or state programs as well; however, additional information may be needed to satisfy specific program requirements. For example, Attachment A indicates additional information needed by the Natural Resources Conservation Service (NRCS) to satisfy the Swampbuster provisions of the Food Security Act.

## Mitigation Site

- c. Describe and quantify by acreage and/or linear feet the aquatic resource type and functions to be gained at the mitigation site.
- d. Describe the contribution to overall watershed/regional functions that the mitigation site is intended to provide. Describe how the mitigation project will contribute to aquatic resource functions within the watershed or region (or sustain/protect existing watershed functions). Address whether the planned mitigation project will connect to other existing aquatic resources or wildlife habitats.
- e. Describe the process of site selection in terms of cost, existing technology, and logistics.
- f. For proposed mitigation that is off-site and/or out-of-kind, explain why on-site or in-kind options are not practicable or environmentally preferable.

## **2. Baseline Information - for proposed impact site, proposed mitigation site and, if applicable, proposed reference site(s).**

- a. Describe the exact location of the project.
  - 1. Provide coordinates (preferably using hand held GPS) and a written description of the project location for impact and mitigation sites. Include township, range and section (if applicable); block, lot, and other real estate description; county, state, nearest town, water basin, etc.
  - 2. Provide location maps, including 7.5 Minute Series U.S.G.S quadrangles, aerial/satellite photos and NRCS soils maps, that clearly mark the boundaries of impact and mitigation sites.
  - 3. Provide a vicinity map that shows the location of the impact and mitigation sites in relation to the nearest town or city. These maps should be made from state highway, county road and/or city maps.
- b. Describe any assessment method(s) used to quantify impacts to aquatic resource functions (e.g., Hydrogeomorphic Method (HGM), Wetlands Rapid Assessment (WRAP), USEPA Rapid Bioassessment Protocols (RBP), etc.), and provide an explanation of findings. The same method should be used at both impact and mitigation sites.
- c. Describe the existing hydrology of the impact site and mitigation site.
  - 1. Describe water source(s) (e.g. precipitation, surface runoff, groundwater, over flow from stream) and losses (e.g., evapotranspiration, infiltration, drainage pathways, etc.).
  - 2. Describe the hydroperiod (seasonal depth, duration, and timing of inundation and/or saturation).
  - 3. Describe Rosgen stream type, if known.
  - 4. Clearly mark the contributing drainage area on a 7.5 Minute Series U.S.G.S. Quad Map.
  - 5. Discuss historical hydrology parameters if they differ from present conditions.
- d. Describe the existing vegetation on both the impact and mitigation sites.
  - 1. List the dominant species in under, mid and upper stories. Include the wetland indicator status of each species.
  - 2. Provide a qualitative analysis of the existing vegetation; include characteristics such as density, general age and health, and presence of native/non-native/invasive species.
  - 3. Provide an estimate of the percent vegetative cover and a description of community structure (canopy stratification).
  - 4. Provide a vegetation cover map that shows the location of plant communities.

- e. Describe the existing soils.
  1. Identify the soil survey classification and series and/or stream substrate. Indicate whether the mapped soil type is listed on the local or national lists of hydric soils.
  2. Provide a soil profile description (e.g., depth of horizons, matrix and redoximorphic feature colors using Munsell Color Chart, redoximorphic feature abundance/contrast, hydric soil indicators, etc.).
- f. Discuss the existing wildlife usage of the site. Include a statement disclosing whether any species listed as threatened or endangered under the Endangered Species Act might be affected by, or found in the vicinity of, the proposed mitigation project. Also include a statement, if known, whether any State listed threatened or endangered species, or species of concern, might be affected by, or found in the vicinity of, the proposed mitigation project. Describe the historic, current, and anticipated land use of the proposed mitigation site and surrounding area. If applicable, include a copy of a certified wetland determination from the Natural Resources Conservation Service.
- h. Identify the current owner(s) and renter(s) (if applicable) of the mitigation site.
- i. Provide a summary of the watershed and surrounding land use.
  1. Discuss the impairment status and impairment type (e.g., 303(d) list) of aquatic resources.
  2. Describe the watershed land uses (e.g., percent ag, forested, wetland, developed).
  3. Describe the size and/or width and location of any natural buffers.
  4. Describe the landscape connectivity and include the proximity and connectivity of existing aquatic resources and natural upland areas (show on map).
  5. Describe the relative amount of aquatic resource area that the impact site represents for the watershed and/or region (i.e., by individual type and overall resources).

### **3. Mitigation Work Plan**

- a. Indicate the proposed timing of work on the mitigation site (before, concurrent with or after authorized impacts); if mitigation is not in advance or concurrent with impacts, explain why it is not practicable and describe other measures to compensate for the consequences of temporal losses.
- b. If applicable, provide a copy of the proposed grading plan.
  1. Indicate existing and proposed elevations and slopes.
  2. Describe plans for establishing appropriate microtopography and/or macrotopography. Reference wetland(s) or stream(s) can provide design templates.
- c. Describe the proposed construction methods (e.g., equipment to be used).
- d. Indicate the proposed construction schedule; include the expected beginning and ending dates of each construction phase as well as the expected date for an as-built plan.
- e. Describe the plans for establishing hydrology within the mitigation site.
  1. Indicate the source of water.
  2. Indicate any connection(s) to existing waters.
  3. Describe the proposed hydroperiod (seasonal depth, duration, and timing of inundation and saturation), percent open water, and, if applicable, water velocity.
  4. Discuss any potential interaction with groundwater.
  5. Provide existing monitoring data, if applicable; indicate the locations of monitoring wells and stream gauges on a site map.
  6. Describe any proposed stream or other open water geomorphic features (e.g., riffles, pools, bends, deflectors).

7. Explain how the design is sustainable and self-maintaining. Provide evidence that a legally defensible, adequate and reliable source of water exists.
- f. Describe the plans for establishing hydrophytic vegetation within the mitigation site.
    1. Indicate the proposed native plant species composition (e.g., list of acceptable native hydrophytic vegetation).
    2. Indicate the proposed source of native plant species (e.g. salvaged from impact site, local source, seed bank), stock type (bare root, potted, seed), and plant age(s)/size(s).
    3. Provide a proposed plant zonation/location map (refer to the grading plan to ensure plants will have an acceptable hydrological environment).
    4. Describe the proposed plant spatial structure; include the proposed quantities/densities, % cover, community structure (e.g., canopy stratification).
    5. Discuss expected natural regeneration from existing seed bank, plantings, and natural recruitment.
  - g. Describe the plans for establishing hydric soils within the mitigation site.
    1. Indicate the source of soils (e.g., existing top soil, imported top soil from impact site) and any proposed soil amendments (e.g., organic material or topsoil).
    2. Provide details of proposed erosion- and soil compaction-control measures.
  - h. Describe any planned habitat features (large woody debris, nest islands, etc. on map).
  - i. Identify any planned vegetated buffer areas. Include physical characteristics such as location, dimensions, native plant composition, spatial and vertical structure.
  - j. Describe any other planned features, such as interpretive signs, trails, fence(s), etc.
  - k. Describe any proposed maintenance plans. These plans could include, but not be limited to, measures to control herbivory, man-induced destruction (e.g., all-terrain vehicles, farm equipment, etc.) of mitigation plantings.
    1. Describe any plans to control invasive species (plant and animal).

#### **4. Identify Performance Standards and Identify Success Criteria of Mitigation Site**

- a. Identify clear, precise, quantifiable parameters that can be used to evaluate the status of desired functions. These shall include hydrological, vegetative and soil measures (e.g., plant species richness, percent exotic/invasive species, and water inundation/saturation levels) but may also include other criteria. Propose realistic success criteria based on the purpose of the compensatory mitigation, design of the site, and functional assessment criteria. Develop measurable success criteria, consistent with the purpose and goals of the compensatory mitigation project, that are achievable by the end of the maintenance and monitoring period (see below).
- b. Set target values or ranges for the parameters identified. Ideally, these targets should be set to mimic the trends and eventually approximate the values of a reference wetland(s).

#### **5. Monitoring Plan**

- a. Identify the party (-ies) responsible for monitoring. If more than one party will be involved, identify the primary party. A summary of the qualifications of the party (-ies) responsible for monitoring may be necessary.
- b. Describe the data to be collected and reported; identify proposed monitoring stations, including transect locations, on site maps.
- c. Describe any assessment tools and/or methods to be used for data collection and monitoring the progress towards attainment of performance standard targets.

- d. Described the proposed format for reporting monitoring data and assessing the status of the mitigation site.
- e. Describe the proposed monitoring schedule; indicate the proposed frequency of monitoring events as well as the proposed duration of the monitoring period.

**6. Remedial Measures if Success Criteria Not Met**

- a. Identify the party (-ies) responsible for adaptive management.
- b. Identify potential challenges (e.g., flooding, drought, invasive species, working on a seriously degraded site, working within an extensively developed landscape) that pose a risk to project success. Discuss how the design accommodates these challenges.
- c. Discuss potential remedial measures in the event mitigation does not meet performance standards in a timely manner.

**7. Site Protection**

- a. Identify the parties responsible and their role (e.g., site owner, easement owner, maintenance implementation). If more than one party will be responsible, identify the primary party.
- b. Provide a draft copy of any proposed long-term legal protection instrument (e.g., conservation easement, deed restriction, transfer of title) and schedule for when the instrument will be recorded with the appropriate entity.
- c. Provide details of any proposed plans for long-term physical protection (e.g., interpretive signs, fencing, tree guards, etc.).

**8. Financial Assurances**

This requirement may be necessary depending on size, location, and/or complexity of the mitigation site.

- a. For each of the following, identify the party (-ies) responsible to establish and manage the financial assurance, the specific type of financial instrument, the method used to estimate assurance amount, the date of establishment, and the release and forfeiture conditions:
  - 1. Construction phase
  - 2. Maintenance
  - 3. Monitoring
  - 4. Remedial measures
  - 5. Project success
- b. Indicate what potential types of assurances (e.g., performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, etc.) will be used.
- c. Indicate the schedule by which financial assurance will be reviewed and adjusted to reflect current economic factors.

**ATTACHMENT A**  
**NATURAL RESOURCES CONSERVATION SERVICE (NRCS)**  
**PROGRAM REQUIREMENTS<sup>3</sup>**

- NRCS conservation practice standards and specifications
- NRCS Environmental Evaluation
- Mitigation agreement
- Federal/State/Local required permits
- Hazardous Substance Examination Checklist
- Compatible use statement:
  - Allowable uses (e.g. hunting, fishing)
  - Prohibited uses (e.g. grazing, silviculture)
  - Uses approved by compatible use permit
- Copy of recorded easement
- Subordination waiver on any existing liens on mitigation site
- Statement of landowner's tax liability
- Copy of Warranty Deed from landowner's attorney (no encumbrances, if so list)
- Copy of certified wetland determination:
  - NRCS-CPA-026 Highly Erodible Land and Wetland Conservation Certification
  - Wetland label map
- Copy of FSA Good Faith Waiver
- Copy of easement(s) ingress/egress granted to USDA employees for gaining legal access to mitigation site
- Copy of NRCS-CPA-38 Request for Certified Wetland Determination/Delineation

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<sup>3</sup> For a complete list of the program requirements needed by NRCS to satisfy the Swampbuster provisions of the Food Security Act see the National Food Security Act Manual.

## Attachment B

### Definitions

**Compensatory Mitigation** - For purposes of Section 10/404, compensatory mitigation is the restoration, creation, enhancement, or in exceptional circumstances, preservation of wetlands and/or other aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Conservation Easement** - A legally binding, recorded instrument approved by the District to protect and preserve mitigation sites.

**Creation** - The establishment of a wetland or other aquatic resource where one did not formerly exist.

**Deed Restriction** - A provision in a deed limiting the use of the property and prohibiting certain uses. The Memphis District approves mitigation areas and requires deed restrictions to protect and preserve mitigation sites.

**Enhancement** - Activities conducted in existing wetlands or other aquatic resources that increase one or more aquatic functions.

**Farm Tract** - A unit of contiguous land under one ownership that is operated as a farm or part of a farm.

**Loss of Waters of the US** - Waters of the US that include the filled area and other waters that are permanently adversely affected by flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent above-grade, at-grade, or below-grade fills that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The loss of streambed includes the linear feet of streambed that is filled or excavated.

**Performance Standards** - Observable or measurable attributes that can be used to determine if a compensatory mitigation project meets its objectives.

**Permanent Above-grade Fill** - A discharge of dredged or fill material into waters of the US, including wetlands, that results in a substantial increase in ground elevation and permanently converts part or all of the waterbody to dry land.

**Preservation** - The protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection and/or enhancement of the overall aquatic ecosystem. Preservation as compensatory mitigation is rarely accepted, unless it is combined with restoration, enhancement, or creation projects sufficient to ensure "no net loss" of functions or values.

**Restoration** - Re-establishment of wetland and/or other aquatic resource characteristics and function(s) at a site where they have ceased to exist, or exist in a substantially degraded state.

**Vegetated Buffer** - A vegetated upland or wetland area next to rivers, streams, lakes, or other open waters which separates the open water from developed areas, including agricultural land. Vegetated buffers provide a variety of aquatic habitat functions and values (e.g., aquatic habitat for fish and other aquatic organisms, moderation of water temperature changes, and detritus for aquatic food webs) and help improve or maintain local water quality. A vegetated buffer can be established by maintaining an existing vegetated area or planting native trees, shrubs, and herbaceous plants on land next to open-waters. Mowed lawns are not considered vegetated buffers because they provide little or no aquatic habitat functions and values. The establishment and maintenance of vegetated buffers is a method of compensatory mitigation that can be used in conjunction with the restoration, creation, enhancement, or preservation of aquatic habitats to ensure that activities authorized result in minimal adverse effects to the aquatic environment.

**Vegetated Shallows** - Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

**Waterbody** - A waterbody is any area that in a normal year has water flowing or standing above ground to the extent that evidence of an ordinary high water mark is established. Wetlands contiguous to the waterbody are considered part of the waterbody.

### STREAM TERMINOLOGY

**Bankfull Stage** - The point at which water begins to overflow onto its floodplain. This may or may not be at the top of the stream bank on entrenched streams. Typically, the bankfull discharge recurrence interval is between one and two years. It is this discharge that is most effective at moving sediment, forming and removing bars, shaping meanders and generally doing work that results in the morphological characteristics of channels. Bankfull stage is not considered the OHWM by the Corps.

**Channel Dimension** - The two-dimensional, cross sectional profile of a channel taken at selected points on a reach, usually taken at riffle locations. Variables that are commonly measured include width, depth, cross-sectional area, floodprone area and entrenchment ratio. These variables are usually measured relative to the bankfull stage.

**Channel Pattern** - The sinuosity or meander geometry of a stream. Variables commonly measured include sinuosity, meander wavelength, belt width, meander width ratio and radius of curvature.

**Channel Profile** - The longitudinal slope of a channel. Variables commonly measured include water surface slope, pool-to-pool spacing, pool slope and riffle slope.

**Channelized stream** - Stream that has been degraded (straightened) by human activities. A channelized stream will generally have increased depth, increased width, and a steeper profile, be disconnected from its floodplain and have a decreased pattern or sinuosity.

**Compensatory Stream Mitigation** - The restoration, enhancement, or, for streams of national or state significance because of the resources they support, preservation of streams and their associated floodplains for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. Compensatory stream mitigation may be required for impacts to perennial and intermittent streams and should be designed to restore, enhance, and maintain stream uses that are adversely impacted by authorized activities.

**Ditches Acting as Streams** - Considered to be waters of the United States.

**Ephemeral Stream** - An ephemeral stream has flowing water only during and for a short duration after precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from precipitation is the primary source of water for stream flow. Ephemeral streams typically support few aquatic organisms. When aquatic organisms are found they typically have a very short aquatic life stage.

**Flood-Prone Area** - Floodplain width measured at an elevation corresponding to twice the maximum bankfull depth. The area often correlates to an approximate 50-year flood or less.

**Intermittent Stream** - An intermittent stream has flowing water during certain times of the year, when ground water provides water for stream flow. During dry period, intermittent streams may not have flowing water. Runoff from precipitation is a supplemental source of water for stream flow. The biological community of intermittent streams is composed of species that are aquatic during a part of their life history or move to perennial water sources.

**OHWM** - The term ordinary high water mark (OHWM) means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

**Perennial Stream** - A perennial stream has flowing water year-round during a typical year. The water table is located above the streambed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from precipitation is a supplemental source of water for stream flow. Perennial streams support a diverse aquatic community of organisms year round and are typically the streams that support major fisheries.

**Stream Enhancement** - Stream rehabilitation activities undertaken to improve water quality or ecological function of a fluvial system. Enhancement activities generally will include some activities that would be required for restoration. These activities may include in-stream or stream-bank activities, but in total fall short of restoring one or more of the geomorphic variables: dimension, pattern and profile. Any proposed stream enhancement activity must demonstrate long-term stability.

**Stream Preservation** - Protection of ecologically important streams, generally, in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include the protection of upland buffer areas adjacent to streams as necessary to ensure protection or enhancement of the overall stream. Generally, stream preservation should be in combination with restoration or enhancement activities. Under exceptional circumstances, preservation may stand-alone where high value waters will be protected or ecologically important waters may be subject to developmental pressure.

**Stream Relocation** - Movement of a stream to a new location to allow an authorized project to be constructed in the stream's former location. In general, relocated streams must reflect the dimension, pattern and profile indicated by a natural reference reach/condition in order to be adequate compensation for the authorized stream impact. Relocated streams will generally require wooded protected buffers of sufficient width. Relocations resulting in a reduced channel length will generally require mitigation.

**Stream Restoration** - (As a category used for mitigation) The process of converting an unstable, altered, or degraded stream corridor, including adjacent riparian zone (buffers) and flood-prone areas, to its natural stable condition considering recent and future watershed conditions. This process should be based on a reference condition/reach for the valley type and includes restoring the appropriate geomorphic dimension (cross-section), pattern (sinuosity), and profile (channel slopes), as well as reestablishing the biological and chemical integrity, including transport of the water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium.

**Stream Riparian Zone** - A riparian zone is the area of vegetated land along each side of a stream or river that includes, but is not limited to, the floodplain. The quality of this terrestrial or wetland habitat varies depending on width and vegetation growing there. As with vegetated buffer, functions of the riparian zone include reducing floodwater velocity, filtering pollutants such as sediment, providing wildlife cover and food, and shading the stream. The ability of the riparian zones to filter pollutants that move to the stream from higher elevations results in this area being referred to as a buffer zone. The riparian zone is measured landward from the bankfull elevation on each side of a stream or river.

**Streambank Stabilization** - The in-place stabilization of an eroding streambank. Stabilization techniques, which include primarily natural materials, like root wads and log crib structures, as well as sloping stream banks and revegetating the riparian zone may be considered for mitigation. When streambank stabilization is proposed for mitigation the completed condition should be based on a reference condition.

**Vegetated Buffer** - An upland or wetland area vegetated with native trees and shrubs next to rivers, streams, lakes, or other open waters that separate aquatic habitats from developed areas, including agricultural land.

## Attachment C Stream Description Information

Project Name \_\_\_\_\_ File # \_\_\_\_\_ Date \_\_\_\_\_

**Office Determination**

- USGS 7.5 minute topographic map
  - Drainage pattern \_\_\_\_\_ Y \_\_\_\_\_ N
  - Blue line \_\_\_\_\_ Y \_\_\_\_\_ N
  - Evidence of channelization \_\_\_\_\_ Y \_\_\_\_\_ N
- NWI map
  - Riverine classification \_\_\_\_\_ Y \_\_\_\_\_ N
  - Adjacent wetlands \_\_\_\_\_ Y \_\_\_\_\_ N
  - Evidence of channelization \_\_\_\_\_ Y \_\_\_\_\_ N
- USDA soil map (if available)
  - Stream shown on map \_\_\_\_\_ Y \_\_\_\_\_ N
  - Evidence of channelization \_\_\_\_\_ Y \_\_\_\_\_ N
- Aerial photo (if available)
  - Riparian corridor shown \_\_\_\_\_ Y \_\_\_\_\_ N
  - Evidence of channelization \_\_\_\_\_ Y \_\_\_\_\_ N
- Consultant/Engineering information available \_\_\_\_\_ Y \_\_\_\_\_ N
- On 303d list \_\_\_\_\_ Y \_\_\_\_\_ N
- Size of Watershed \_\_\_\_\_ Acres
- Named waterway (Circle One)    Yes    No    Name: \_\_\_\_\_
- Notes: \_\_\_\_\_

**Field Determination**

- OHWM present \_\_\_\_\_ Y \_\_\_\_\_ N
- Type of Flow            Ephemeral \_\_\_\_\_ Intermittent \_\_\_\_\_ Perennial \_\_\_\_\_
- Estimation of channel size
  - Width at top of bank \_\_\_\_\_ ft.
  - Width at OHWM \_\_\_\_\_ ft.
  - Width at bottom \_\_\_\_\_ ft.
  - Height to top of bank \_\_\_\_\_ ft.
  - Height to OHWM \_\_\_\_\_ ft.
- Evidence of OHWM
  - Natural shelving \_\_\_\_\_ Y \_\_\_\_\_ N
  - Natural bank line \_\_\_\_\_ Y \_\_\_\_\_ N
  - Soil change \_\_\_\_\_ Y \_\_\_\_\_ N
  - Vegetation loss \_\_\_\_\_ Y \_\_\_\_\_ N
  - Clear shoreline \_\_\_\_\_ Y \_\_\_\_\_ N
  - Presence of litter/debris \_\_\_\_\_ Y \_\_\_\_\_ N
  - Local characteristics: \_\_\_\_\_
- Notes: \_\_\_\_\_

- Riparian corridor present at project site \_\_\_\_\_ Y \_\_\_\_\_ N
- Estimation of corridor width \_\_\_\_\_ ft.
- Notes: \_\_\_\_\_

- Riparian corridor present upstream \_\_\_\_\_ Y \_\_\_\_\_ N
- Riparian corridor present downstream \_\_\_\_\_ Y \_\_\_\_\_ N
- Wetlands adjacent to stream at project site \_\_\_\_\_ Y \_\_\_\_\_ N
- Riffles/pools present at project site \_\_\_\_\_ Y \_\_\_\_\_ N
- Meanders present at project site \_\_\_\_\_ Y \_\_\_\_\_ N
- Notes regarding other characteristics (ex. caving banks, farmed to edge of stream, etc.): \_\_\_\_\_

Jurisdictional Channel (Circle One)            Yes    No