U.S. Army Corps of Engineers
Tulsa District

Department of the Army
Regulatory Program

Aquatic Resource
Mitigation and Monitoring Guidelines

October 2004

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MITIGATION AND MONITORING GUIDELINES
U.S. Army Corps of Engineers, Tulsa District

October 12, 2004

I. Introduction

The U.S. Army Corps of Engineers (USACE) has the responsibility under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 to require permits for certain construction activities in "waters of the United States". "Waters of the United States" includes rivers, lakes, streams, creeks, natural ponds, and wetlands adjacent to such waters (defined at 33 CFR 328). These "waters of the United States" collectively represent aquatic resources that provide an innumerable set of services for the general public. These services include, for example, water quality improvement, flood damage reduction, water-related recreation, storm flow conveyance and storage, maintenance of base flow, movement of commerce, spawning and nursery areas for aquatic organisms, and habitat for fish and wildlife.

The supreme goal of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of this Nation's waters. The intent of Section 404 is to protect these waters from the indiscriminate discharge of materials capable of causing pollution. The goal of the Rivers and Harbors Act is to protect the navigable capacity of the Nation's waterways for the movement of interstate commerce.

Construction activities authorized under Department of the Army permits may result in temporary and/or permanent adverse impacts to "waters of the United States", including wetlands. The Regulatory Program regulations (33 CFR 320-331 and 40 CFR 230) authorize the USACE to require mitigation for project-related impacts. The USACE is committed to the protection of the aquatic ecosystem while administering a fair and equitable permit program. The Federal Government has established a goal of "no overall net loss" of wetlands, and the USACE has adopted this goal to the Regulatory Program.

Mitigation of project impacts to aquatic resources requires the development and consideration of project alternatives. These alternatives must employ three mitigation steps that are to be considered in a sequential manner. First, project impacts must be *avoided* to the extent practicable. Second, unavoidable impacts should be *minimized*. Third, remaining unavoidable impacts should be mitigated through *compensatory actions*. This mitigation policy is more explicitly described in the Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines.

Compensatory mitigation may take several forms including restoration, enhancement, creation, or preservation. *Restoration* is the reestablishment of aquatic resource characteristics and functions at a site where they have ceased to exist or exist in a substantially degraded state. *Enhancement* is an activity conducted in existing aquatic resources that increases or improves one or more aquatic functions or characteristics. *Creation* is the establishment of an aquatic

resource where one did not formerly exist (i.e., the conversion of a non-aquatic habitat to aquatic habitat). *Preservation* is the conservation or dedication of ecologically important existing aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms to prevent its destruction or degradation in the future.

Restoration of previously degraded or destroyed wetlands or stream corridors is generally preferred over all other forms of compensatory mitigation due to a higher likelihood of successfully achieving meaningful ecological boost. Preservation of existing wetlands or stream channels is generally the least preferred option due to failure to contribute to "no net loss". While "in-kind" replacement mitigation is generally preferred over "out-of-kind" mitigation, there may be situations where regional aquatic resource needs or priorities tip the balance in favor of "out-of-kind" mitigation. Mitigation may be "on-site" or "off-site", and a number of considerations may influence the preferred option in this regard.

Another category of mitigation approaches is consolidated mitigation (i.e., mitigation banking and "in-lieu-fee" mitigation). Joint-agency Federal guidance has been issued regarding mitigation banking and "in-lieu-fee" mitigation proposals. The Transportation Equity Act for the 21st Century (TEA-21) established a preference for mitigation banking to compensate for unavoidable losses to wetlands or other natural habitat caused by transportation projects receiving Federal assistance under Title 23 of the U.S. Code and the use of the TEA-21 preference is further explained in Federal guidance. While these Tulsa District Guidelines may provide helpful considerations, proponents of consolidated mitigation proposals are referred to the appropriate Federal Guidance for Mitigation Banking, "In-Lieu-Fee", or TEA-21 (listed in Appendix A).

This policy is intended to address mitigation issues in a manner which guides permit applicants toward appropriate, viable, meaningful, adequate, and practicable mitigation proposals to successfully replace lost functions and values of the aquatic ecosystem. The permit applicant is responsible for proposing mitigation for his/her desired project. Additionally, permittees are responsible for implementation, success, and protection of the mitigation site. Permit applications accompanied by an appropriate comprehensive mitigation proposal consistent with the elements of this policy will expedite the administrative review and evaluation of the applicant's proposal. However, submission of a plan to compensate for remaining unavoidable impacts is no guarantee that a permit will be issued. In sensitive or high value ecological systems, the appropriate decision on a permit application may be denial of the permit.

Purpose

The purposes of this policy are: 1) to provide predictability to permit applicants needing to mitigate for anticipated impacts from proposed projects, 2) to improve the success of mitigation implemented by permittees in the Tulsa District, 3) to increase efforts toward mitigation compliance through self-reporting, and 4) ultimately, to meet the goal of "no overall net loss" of wetlands in the Regulatory Program. This would be accomplished through an emphasis on watershed-based mitigation and consideration of regional aquatic resource needs and priorities.

Applicability

This policy applies to all compensatory mitigation proposals associated with permit applications submitted after the effective date of these Guidelines, November 11, 2004. This policy applies to all "waters of the United States" within the Regulatory Boundary of the Tulsa District. For the Regulatory Program authorities, the Tulsa District includes all of Oklahoma, the Texas panhandle and the Red River drainage across northern Texas, and USACE Civil Works Projects within the watersheds of the Arkansas, Verdigris, and Neosho Rivers in the southern half of Kansas. Statewide mitigation and monitoring guidelines are being developed for implementation by the USACE Districts which share the State of Texas. Until such time as the Texas Statewide Guidelines are finalized, these Guidelines will apply to projects within the Tulsa District portions of the State of Texas.

Definitions

Many of the terms used in this policy have been defined within related reference documents.

II. Mitigation

Dictionaries define *"mitigate"* as "to make or become less severe or intense". In the National Environmental Policy Act regulations, the Council on Environmental Quality (40 CFR 1508.20) has further defined mitigation to include:

a. *avoiding* the impact altogether by not taking a certain action or parts of an action,
b. *minimizing* impacts by limiting the degree or magnitude of the action and its implementation,
c. *rectifying* the impact by repairing, rehabilitating, or restoring the affected environment,
d. *reducing* or eliminating the impact over time by preservation and maintenance operations during the life of the action, and
e. *compensating* for the impact by replacing or providing substitute resources or environments.

Existing laws, regulations, and policies relating to mitigation and the Department of the Army Permit Program can be found in Appendix A of this document. These documents are incorporated in this document by reference and the reader is advised to be familiar with these existing guiding references. This document is not intended to summarize or revise these authorities and policies, only to clarify them for application in the Tulsa District.

The goal of compensatory mitigation should be the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters by replacing unavoidable losses of wetlands or streams or the unavoidable loss of functions in a wetland or stream. While the focus of mitigation must be on aquatic resources, mitigation plans may include as a component the protection of upland areas adjacent to the wetlands or aquatic resources as necessary to ensure protection and integrity of the overall aquatic ecosystem.

The best compensatory mitigation would occur as close to the project impact site as possible. Project proponents should strive to incorporate meaningful aquatic resource mitigation in their

site plan at the earliest stage of the design process. The designation of mitigation space in a completed site plan as an after-thought generally results in inadequate space, steep or inappropriate slopes, inadequate buffering from adjacent land use influences, no margin for the expected dynamics of a fluctuating aquatic system, and ultimately, poor or valueless mitigation. In some situations, it is not practicable to provide appropriate mitigation on-site. Consequently, project proponents must find and acquire a suitable off-site location. The ratio of mitigation required against the losses incurred by the project will generally increase the further the mitigation site is situated from the impact site.

Impacts to aquatic resources may be permanent or temporary in nature. Compensatory mitigation may be required for both permanent and temporary aquatic resource impacts. While mitigation for temporary impacts achieved through restoration and remediation of the project site following project completion is typically adequate, impacts that result in a permanent reduction in ecological value (i.e., conversion of a forested wetland to an emergent wetland) may require compensatory mitigation beyond restoration.

Mitigation Strategies

Where avoidance and minimization of project impacts have been maximized to the extent practicable and unavoidable impacts remain, project proponents should consider compensatory actions to counter the aquatic ecosystem losses of the proposed project. As previously stated, compensatory mitigation may take the form of restoration, enhancement, creation, or preservation. The strategy most preferred by the USACE and which has the highest rate of success and meaningful accumulation of mitigation credit is restoration of previously degraded or destroyed aquatic resources (i.e., wetlands or stream channels). All options for restoration of previously degraded aquatic resources in the project vicinity should be examined and exhausted before pursuing alternative strategies.

Enhancement of existing aquatic resources is similar to restoration such that the existing aquatic resource may have been degraded but not completely destroyed and the improvement in value or increase in size or function anticipated from the enhancement activity(ies) is measurable. For example, simply planting more trees in a healthy wetland forest would not be considered an appropriate enhancement option. Enhancement activities which favor a single faunal species or group of species or which involve hydrologic manipulation(s) should be carefully examined to ensure the enhancement activities are not detrimental to other valuable functions of the existing aquatic resource.

Creation of wetlands in non-wetland areas will be considered a viable mitigation strategy where it does not destroy valuable uplands and where uncertainties regarding hydrology are adequately addressed.

Preservation of existing wetlands or stream channels is the least preferred option. Preservation of an existing quality aquatic resource(s) does not contribute to “no net loss” unless preservation is only a portion of a larger mitigation plan that includes restoration or enhancement activities. Where preservation is included in a multi-feature mitigation plan, the credit assigned to preservation should not exceed 50 percent of the total mitigation package. Where preservation is

proposed, there must be a demonstrable threat of loss from some future activity that is outside of the control of the permit applicant.

The establishment of upland buffers around existing wetland or aquatic resource sites may be suitable as mitigation where there is a discernable negative influence to the aquatic resource that a buffer would address. Buffers are beneficial to mitigation sites when they: 1) trap sediments and remove contaminants resulting from surrounding land uses, 2) provide food, shelter, nesting, and travel corridors for terrestrial and wetland dependent wildlife, 3) shade the aquatic system, and 4) reduce the effects of non-point source pollution. To be effective for mitigation purposes, buffers should be at least 50 feet wide. For all linear aquatic systems (e.g., streams), a minimum 50-foot buffer should be included on each side where possible. Where this minimum buffer width cannot be attained, permit applicants may implement a variable-width buffer to achieve an average width of 50 feet. For better protection, buffers widths in excess of 100 feet on each side may be included in a plan. However, credit will generally not be given for the upland portions beyond the 100-foot width (per stream bank) unless it is demonstrated to be necessary for ecosystem function through an accepted scientific assessment methodology. Where slopes are steep in the buffer zone, width should be increased to maintain buffer effectiveness.

"In-kind" mitigation represents a match between the type of aquatic resource impacted and the type of aquatic resource provided in mitigation, for example, mitigation of bottomland forested wetland impacts with bottomland forested wetland enhancements or mitigation of herbaceous wetlands with restoration of herbaceous wetlands. "In-kind" replacement mitigation is generally preferred over "out-of-kind" mitigation, and project proponents are advised to follow this pattern in approaching compensatory mitigation. There are circumstances where the impacted wetland type is difficult to replicate or when regional aquatic resource needs or priorities tip the balance in favor of out-of-kind mitigation. Mitigation proposals involving out-of-kind mitigation will typically require higher mitigation ratios even when regional aquatic resource needs favor out-of-kind mitigation. Five basic wetland types are identified in the Oklahoma Wetlands Reference Guide (Oklahoma Conservation Commission, 2000), closed depressions, forested wetlands, playa lakes, riparian corridors, and swamps. Some of these wetland types may be further classified by the predominant vegetative species or community present. Not all wetland and aquatic resource impacts are suitable for offsetting impacts through compensatory mitigation. Some circumstances may require the denial of a permit to protect a sensitive or high quality aquatic resource rather than the implementation of compensatory mitigation.

Mitigation may be "on-site" or "off-site". A number of considerations may influence the preferred and selected option in this regard. As a general rule for case-specific mitigation, compensatory mitigation should occur as close in proximity to the impact site as possible and feasible. Generally, mitigation ratios will be higher as distance between impact site and mitigation site increases.

Mitigation Site Selection Considerations

Diligent consideration must be involved in selection of a mitigation site, even when proposing to mitigate on-site. The recommendations contained in "Incorporating the National Research Council's Mitigation Guidelines into the Clean Water Act Section 404 Program" (Appendix C)

shall be given due consideration in the mitigation site selection and design process. The consideration of the following factors will indicate if a site is suitable or unsuitable for development as a mitigation site:

a. landscape position
b. cost of acquisition and mitigation development
c. previous and current land uses on the potential mitigation site
d. preexisting easements, encumbrances, utilities on the site which cannot be vacated
e. surrounding land uses
f. opportunities to buffer the mitigation site from influences from surrounding land uses and landforms
g. reliable natural supply of water (with rare exception, mitigation proposals involving artificial irrigation or highly managed or manipulated water regimes will not be accepted for consideration; mitigation hydrology must be designed to be self-sustaining under natural conditions and passive management)
h. preexisting water rights in the area
i. suitability of the native substrate to contain water on the surface versus the need for soil amendment or replacement
j. availability of and ability to utilize native wetland substrate to inoculate mitigation site soils to favor natural regeneration of native wetland plants
k. ability to provide permanent protection of the mitigation site through perpetual deed restriction
l. known presence of historical or cultural resources (requires coordination with State Historic Preservation Officer and Tribal Historic Preservation Officers)
m. relationship to local existing fish and wildlife populations or habitat

Mitigation Plans

A mitigation plan should be prepared early in the permit application process. For Nationwide Permit (NWP) activities, where wetland impacts, substantial stream reach impacts, or other substantial aquatic resources are involved, a detailed mitigation and monitoring plan should be submitted with the request for confirmation of the NWP. If a conceptual mitigation plan is submitted with a NWP pre-construction notification, in accordance with NWP General Condition 19, the NWP verification will be conditioned to require the submission and approval of a detailed mitigation plan prior to undertaking the NWP authorized activity in "waters of the United States". For individual permit applications, a preliminary mitigation plan should be prepared and submitted with the permit application. This mitigation plan would then be refined to a final detailed mitigation plan following the public notice comment period and the Tulsa District's review. The Tulsa District will not grant an individual permit in cases where the compensatory mitigation plan has been developed only to the conceptual level. In all cases, the level of detail in the mitigation plan should be commensurate with the magnitude of project impacts.

Mitigation plans should include the elements listed in the Multi-Agency Compensatory Mitigation Plan Checklist and Supplement (Appendix D). Failure to appropriately implement these recommendations or to justify why these recommendations are not followed will delay final approval of the project. All mitigation must be provided long-term protection through a

perpetual deed restriction or through the establishment of a conservation easement for mitigation on public lands.

As identified in the Checklist, performance standards should be included in all compensatory mitigation plans. Performance standards may vary depending on the nature of the aquatic resource to be achieved through mitigation and because of local conditions. Acceptable performance standards for the Tulsa District include the following:

a. achieving percent ground cover rate with desirable wetland or aquatic plant species exceeding 80 percent at 3 years,
b. achieving a survival rate of installed trees and shrubs exceeding 75 percent after 3 years,
c. achieving a stems per acre count for bare-root seedling reforestation of greater than 300 individuals of native species surviving after 5 years, and
d. species diversity of plantings and volunteer recruitment with no single species constituting greater than 30 percent of the individuals at the end of the monitoring term.

Mitigation Ratios

If mitigation efforts in all cases: 1) were situated adjacent to the site of the impact, 2) replicated the entire suite of functions provided by the impact site, 3) achieved immediate ecological function, and 4) were fully successful, then one-for-one mitigation might be acceptable. However, mitigation activities have inherent risks against success, delays in achieving ecological function, and often are located in a position where the entire suite of functions cannot be replicated. Therefore, one-for-one mitigation is rarely acceptable.

With regard to wetlands, the Tulsa District will typically require a minimum mitigation ratio of 1.5 replacement acres to 1.0 acre of impacted aquatic resource (1.5:1). This is the base minimum, and this ratio may be increased based on the USACE consideration of factors relevant to a specific mitigation proposal. While methods exist to measure value of impacts and losses on a functional basis, the expertise required to assess this accurately is not widely available at this time, and the Tulsa District will accept acreage as a surrogate measure of functional loss. Mitigation requirements for impacts to wetlands that are difficult to replace (i.e., mature high quality bottomland hardwood wetlands, bogs, and seeps) will generally be higher than the minimum mitigation ratio and will be determined on a case-by-case basis by the USACE. For proposals involving less-preferred mitigation strategies (i.e., preservation), the Tulsa District has required mitigation in excess of a 10:1 mitigation ratio.

With regard to streams, where an applicant proposes stream channel or stream corridor restoration as mitigation for stream channel impacts, the Tulsa District will typically require a minimum mitigation ratio of 1:1, where the width of the mitigation channel is comparable to the width of the impacted stream channel and the stream type matches (perennial for perennial, intermittent for intermittent, and ephemeral for ephemeral). Where stream type does not match or stream channel size differs by more than 100 percent, the minimum acceptable mitigation ratio is increased to 2:1 or higher. For projects where construction disturbance is limited to a narrow right-of-way crossing of a stream (i.e., a linear-project such as utility line or replacement of a small roadway), additional compensatory mitigation will not be required if the disturbed

area is restored to the extent possible following completion of the project. Where permanent right-of-way widths exceed 100 feet (regardless of stream width) or the project involves stream channelization, compensatory mitigation may be required in addition to remediation of the temporary disturbance.

With regard to lake impacts, the Tulsa District will require a minimum mitigation ratio of 1:1 where the area of impact exceeds 1/10 acre. In these situations, mitigation may be achieved through enhancements of existing lake areas or environs for water quality or aquatic habitat function, and it will generally not be necessary to physically manipulate the adjoining landscape to enlarge the lake area. Where a proposed fill activity would result in a measurable loss of flood control pool storage at a lake managed for flood control purposes, compensatory excavation within the flood control landscape may be required by the USACE to replace the storage volume losses anticipated from the project. Furthermore, for projects on Federally-managed lakes, mitigation requirements may be adjusted consistent with local resource needs or management priorities.

Where an applicant desires to propose mitigation below these minimum mitigation ratios, the proposed mitigation plan must be accompanied by an accepted scientific functional assessment methodology that demonstrates the reduced acreage, below the minimum mitigation ratio stated above, is adequate to replace the functional quality of the impacted aquatic resource. The Tulsa District has not adopted a stream, wetland, or aquatic resource assessment methodology at this time. Future evaluation of methodologies may result in the endorsement of a specific methodology(ies) for particular types of aquatic resources.

In addition to the minimum mitigation ratios stated above, there are a number of factors that influence the ratio of mitigation required against anticipated project-incurred impacts or losses to aquatic resources. The factors on the following list (not an exhaustive listing) will be considered by the USACE in evaluating mitigation plans and will drive required mitigation ratios upward:

a. increased distance of mitigation site from impact site (increase mitigation 10 percent for each increment of 10 miles of distance)
b. high biological diversity of the impact site (increase mitigation 50-100 percent, or more)
c. physical or structural complexity of the impact site (increase mitigation 20–50 percent)
d. ecological uniqueness of the impact site (increase mitigation 50-100 percent or more)
e. length of time necessary to achieve functional maturity at the mitigation site (increase mitigation 20-300 percent)
f. situating the mitigation site in a different watershed (based on USGS 8-character Hydrologic Unit Code) from the impact site (increase mitigation 50 percent)
g. situating the mitigation site in a different ecoregion from the impact site (increase mitigation 50 percent)
h. increased time lag between construction impacts and completion of mitigation activities (increase mitigation 20 percent for each year delay)
i. reasonably anticipated negative and detrimental influences on new mitigation sites (human activities, surrounding land uses, natural predation or herbivory, etc.) (increase mitigation 25 percent)

j. inconsistency in the source of hydrology for the mitigation site (increase mitigation 100 percent)
k. pre-existing easements, existing utilities, prior land uses on the mitigation site (increase mitigation by amount of site encumbered by such restrictions)
l. necessity of significant soil amendment or soil replacement to make mitigation site viable (increase mitigation 15 percent)
m. reliance on enhancement, or creation strategies as opposed to restoration (increase mitigation 20-50 percent)
n. reliance on preservation strategy as mitigation (increase mitigation ratio to minimum 8:1)
o. use of out-of-kind mitigation for incurred impacts (increase mitigation 100 percent).

Mitigation requirements may also be reduced by 10 percent if the mitigation is constructed at least 6 months prior to authorized project impacts.

Mitigation Actions

Wetlands: Mitigation of wetland losses can be accomplished through a variety of approaches. In some settings, mitigation options are scarce due to existing land development. Innovation toward effective mitigation ideas is especially crucial in urban areas. The States of Oklahoma and Texas both have wetland registry programs that may provide opportunities for permit applicants to sponsor mitigation activities on private lands. These registry programs are listed in Appendix B. The following actions are some of the options that may be considered to achieve wetland mitigation credit:

a. restoration of the hydrology of a former wetland site through the removal of berms or levees, or the plugging or filling of ditches and drainageways
b. replanting of native vegetation in previously cleared wetlands or wetlands converted to agriculture
c. removal of fill material from wetlands and restoration of natural contours
d. restoration of sheet flow to a flood plain site (dispersion of concentrated flow)
e. planting of desirable hardwood species in a low quality wooded wetland
f. designation, installation, planting, and protection of upland buffers around existing wetland sites
g. aquatic habitat enhancement activities such as the placement of coarse woody debris (stumps, logs, heavy branches, standing snags) in an existing wetland
h. wildlife enhancement activities such as removal, control, or eradication of undesirable or low-value vegetation species and replacement plantings of greater diversity and desirability
i. removal and control of exotic or noxious plants
j. hydrologic enhancement of existing degraded wetlands
k. erosion and sediment control measures to reduce or eliminate detrimental sediment contributions to a degraded wetland
l. construction of new wetlands on a non-wetland site
m. preservation of existing threatened wetlands through acquisition and perpetual deed restriction

Streams: The mitigation of stream channel impacts can be accomplished in a variety of ways. The following actions may be considered to achieve stream system mitigation credit:

a. restoration of a previously channelized or modified stream channel to appropriate channel geometry including sinuosity, gradient, channel shape, and access to flood plain
b. enhancement of instream aquatic habitat or restoration of stream bed diversity (substrate, structure, holes, structurally persistent bars and points, coarse woody debris secured in the stream bed, etc.)
c. restoring natural channel features such as riffles and pools appropriate to stream type
d. restoration, enhancement, establishment, or protection of natural buffers and riparian corridor along a stream
e. increasing tree canopy and effective shading over a stream
f. exclusion of livestock from a stream corridor including streamside zones
g. installation of grade control structures in a degrading stream
h. removal of check dams, weirs, or other man-made structures which block aquatic organism movement or migration, or are contributing to stream bank erosion
i. removal of impoundments, dams, or dikes and restoration of natural stream dynamics and physical structure
j. installation of natural erosion and sediment control measures in eroded areas
k. reduce or eliminate sediment sources in the immediate watershed
l. restore the dynamic relationship between a stream and its flood plain

Implementation of Mitigation

Mitigation should be implemented concurrent with project impacts to the extent possible. In cases where concurrent mitigation is not possible, mitigation will be required to be implemented no later than 12 months after construction of the authorized project. Monitoring should begin at the end of mitigation construction or installation. In some large mitigation situations, the USACE may require monitoring during the construction phase at the mitigation site to assure that the mitigation is being constructed as specified, in addition and in advance of monitoring required to assure mitigation development and success.

Standard construction Best Management Practices (BMPs) should be employed throughout the construction phase of a mitigation project to eliminate, control, and reduce impacts to adjacent lands and waters. BMPs should incorporate implementation of the following:

a. erosion control practices employing mulch, composts, excelsior matting, or temporary vegetation for construction-disturbed sites
b. runoff and sedimentation basins or vegetated filter strips where necessary to prevent transport of sediments to aquatic areas
c. siltation barriers on land (fences and hay bales) and in water (turbidity curtains)
d. minimization of size and duration of temporary activities in aquatic areas
e. storage of fuels and materials shall occur at a location above the existing and intended Ordinary High Water Mark where they cannot be carried into aquatic areas by high flows and should be removed from any likely flood zone prior to any predicted flood event

f. all fueling and servicing of vehicles and equipment should be done above the Ordinary High Water Mark
g. if construction uncovers or disturbs any previously unknown historical, archeological, or cultural materials, or human remains, construction activities shall immediately cease and the USACE Regulatory Branch shall be immediately contacted for further instruction

III. Monitoring Requirements

Monitoring will be required on all mitigation plans. The terms of monitoring will be appropriate to the type, size, scope, and complexity of the mitigation actions. The length of monitoring will generally be shortest where the mitigation plan involves restoration of previously degraded wetlands or stream corridors with a limited amount of woody plantings and where there is a low opportunity for failure of the mitigation. The monitoring of aquatic resource mitigation will never be less than 3 years in length, including no less than 3 full growing seasons. The length of monitoring term will be increased to a minimum of 5 years where the mitigation plan involves substantial tree planting, construction of wetlands in non-wetland sites, or restoration of a channelized or impaired stream to a historic alignment or condition. Monitoring requirements may be increased up to 10 years where the mitigation plan involves high-risk enhancements, bottomland hardwood reforestation, or when activities on surrounding properties warrant longer monitoring.

Monitoring will generally require a minimum of three inspections each year, all during the growing season. These inspections should be scheduled to correspond to the spring, summer, and fall seasons. Monitoring inspections are to be conducted by the permittee or permittee's agent. The information gathered during site inspections should focus on the success criteria and performance standards of the subject mitigation plan. Collection of research data or scientific information not directly related to the performance standards and success criteria may occur during site inspections or at other times but should not be included in the submitted monitoring reports.

Monitoring activities should include assessment of the hydrologic, vegetative, and physical features of the mitigation site. Depending on the vegetative plan for the site and the plans performance standards, herbaceous, shrub, and tree strata will likely require independent assessment. Hydrologic monitoring may include the installation and monitoring of wells or staff gauges, observation and recording of water levels, and documentation of interactions with adjacent aquatic areas (in-flow and out-flow). Vegetative assessment should include identification of dominant plants to the species level, size, density, and condition of growth (health and vigor). Physical feature monitoring includes such aspects as the stability of construction disturbed soils, condition and stability of constructed features, adequacy of soil compaction or preparation, influences from adjoining lands, etc.

Deficiencies identified through monitoring should be rectified as soon as practicable. Corrective actions that may be anticipated include replanting of non-surviving plantings, control of invasive, noxious, or competing vegetation which threatens survival of the desired native species, preventative actions against herbivory, stabilization of erodible soils on adjacent

surrounding slopes, and access control limiting human interference with mitigation development. For all corrective actions taken at a mitigation site, a follow-up report by the permittee will be required (it may be included in the regular annual report) to validate the successful completion of the corrective actions. Where a deficiency is attributable to extreme or abnormal climatic conditions, the monitoring report should include documentation of such conditions. Abnormal conditions will not be a basis for accepting sub-performing mitigation. The permittee remains responsible for mitigation success.

Findings from the periodic site inspections should be summarized in an annual report. The USACE reserves the right to require the submission of quarterly monitoring reports during construction at the mitigation site, or for the first year following the implementation of mitigation actions, or as mitigation risks or needs warrant. Any monitoring report submitted to the USACE generally should not exceed 10 pages of text and should include the following elements:

1. Project name and permit number
2. Project location, map, site drawings, photographic station locations
3. Permittees name, address, phone
4. Report preparer's name, address, phone
5. Purpose and Goals for mitigation site
6. Brief summary of mitigation strategy/actions
7. Date mitigation action commenced
8. Dates of quarterly site inspections
9. Dates of any maintenance activities
10. Summary of observations and measurements
11. Assessment of success toward the performance standards or success criteria
12. Report any observed problems (adverse water levels, failure, underperformance, vandalism, erosion, invasive plants, storm damage, etc.)
13. Implemented or recommended solutions to identified problems or deficiencies
14. Photos from each of the site inspections by photographic station location and date

Appendix A: Authorities

These Guidelines are associated with the following statutes, regulations, and policies.

1. Clean Water Act Section 404 [33 USC 1344]. http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sec404.htm
2. Rivers and Harbors Act of 1899 Section 10 [33 USC 403 et seq.]. http://www.usace.army.mil/inet/functions/cw/cecwo/reg/rhsec10.htm
3. Environmental Protection Agency, Section 404(b)(1) Guidelines [40 CFR Part 230]. Guidelines for Specification of Disposal Sites for Dredged or Fill Material. http://www.usace.army.mil/inet/functions/cw/cecwo/reg/40cfr230.htm
4. Department of the Army, Section 404 Permit Regulations [33 CFR Parts 320-331]. Policies for evaluating permit applications to discharge dredged or fill material. http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sadmin3.htm
5. Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines [February 6, 1990] http://www.usace.army.mil/inet/functions/cw/cecwo/reg/moafe90.htm
6. Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks [November 28, 1995]. http://www.usace.army.mil/inet/functions/cw/cecwo/reg/mitbankn.htm
7. Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act [November 7, 2000] http://www.usace.army.mil/inet/functions/cw/cecwo/reg/ILFFEDREG.pdf
8. Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, Regulatory Guidance Letter (RGL) No. 02-2 [December 24, 2002] http://www.usace.army.mil/inet/functions/cw/cecwo/reg/RGL2-02.pdf
9. Federal Guidance on the Use of the TEA-21 Preference for Mitigation Banking to Fulfill Mitigation Requirements under Section 404 of the Clean Water Act [July 11, 2003] http://www.usace.army.mil/inet/functions/cw/cecwo/reg/TEA-21Guidance.pdf
10. Title XII of the Food Security Act of 1985 as amended by the Farm Security and Rural Investment Act of 2002 [16 USC 3801 et seq.].
11. National Environmental Policy Act [42 USC 4321 et seq.], including the Council on Environmental Quality's implementing regulations [40 CFR Parts 1500-1508].
12. Fish and Wildlife Coordination Act [16 USC 661 et seq.].
13. Fish and Wildlife Service Mitigation Policy [46 FR pages 7644-7663, 1981].
14. Magnuson Fishery Conservation and Management Act [16 USC 1801 et seq.].
15. National Marine Fisheries Service Habitat Conservation Policy [48 FR pages 53142-53147, 1983].
16. The Transportation Equity Act for the 21st Century (TEA-21)
17. Federal Aviation Administration Advisory Circular on "Hazardous Wildlife Attracts on or near Airports" (AC No: 150/5200-33, 5/1/97)
18. Endangered Species Act of 1973, as amended [16 U.S.C. 1531 et seq.]

19. Migratory Bird Treaty Act [16 U.S.C. 703 et seq.]
20. Issuance of Nationwide Permits [67 FR 2020-2095, January 15, 2002]

Appendix B: Internet Sites and Resources

U.S. Army Corps of Engineers, Tulsa District, Regulatory Permit Program:
http://www.swt.usace.army.mil/permits/permits.cfm

U.S. Army Corps of Engineers, Engineering Research and Development Center - Environmental Laboratory (Waterways Experiment Station), Wetlands Programs:
http://www.wes.army.mil/el/wetlands/wetlands.html

U.S. Environmental Protection Agency, Office of Wetlands and Watersheds:
http://www.epa.gov/owow/wetlands/

An Introduction and User's Guide to Wetland Restoration, Creation, and Enhancement, Developed by the Interagency Workgroup on Wetland Restoration (NOAA, EPA, USACE, USFWS, NRCS):
http://www.nmfs.noaa.gov/habitat/habitatconservation/publications/index.htm
or
http://www.epa.gov/owow/wetlands/finalinfo.html

U.S. Army Corps of Engineers Wetland Delineation Manual, USACE Waterway Experiment Station, Wetland Research Program Technical Report Y-87-1:
http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf

Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S. Government):
http://www.usda.gov/stream_restoration/newgra.html

Wetlands Management Handbook, ERDC/EL SR-00-16, U.S. Army Engineer Research and Development Center, Vicksburg, MS:
http://www.swt.usace.army.mil/permits/wetmanage.pdf

Wetlands Engineering Handbook, ERDC/EL TR-WRP-RE-21, March 2000, U.S. Army Engineer Research and Development Center, Vicksburg, MS:
http://www.wes.army.mil/el/wetlands/pdfs/wrpre21/wrpre21.pdf

Compensating for Wetland Losses Under the Clean Water Act, Committee on Mitigating Wetland Losses, National Research Council, National Academy of Science, 2001:
http://search.nap.edu/books/0309074320/html/

National Wetlands Mitigation Action Plan, (Six Federal agencies) December 24, 2002:
http://www.epa.gov/owow/wetlands/guidance/NWMAP122402signed.pdf

Examples of Performance Standards for Wetland Creation and Restoration in Section 404 Permits and an Approach to Developing Performance Standards, ERDC/EL WG-RS-3.3, U.S.

Army Engineer Research and Development Center, Vicksburg, MS:
http://www.wes.army.mil/el/wrtc/wrp/tnotes/wgrs3-3.pdf

Oklahoma Wetlands Reference Guide, Oklahoma Conservation Commission, 2000 (James E. Henley and Mark S. Harrison, authors).

Riparian Area Management Handbook, Oklahoma Cooperative Extension Service, Oklahoma State University, Oklahoma Conservation Commission, 1998:
http://www.okstate.edu/OSU_Ag/e-952.pdf

Oklahoma Wetland Registry Program, Oklahoma Conservation Commission:
http://www.okcc.state.ok.us/Wetlands/wetlands_registry.htm

Texas Wetland Project Site Registry Program, Texas Parks and Wildlife:
http://www.tpwd.state.tx.us/wetlands/programs/registry/