

DETROIT DISTRICT U.S. ARMY CORPS OF ENGINEERS MITIGATION GUIDELINES AND REQUIREMENTS

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of Engineers
DetroitDistrict

I. Introduction

This document establishes federal compensatory mitigation guidelines for permitted aquatic resource loss or for waters that are adversely affected in the U.S. Army Corps of Engineers' (Corps) Detroit regulatory district comprising Michigan and part of Indiana. Compensatory mitigation is the restoration or creation of areas to replace functions that would be otherwise lost as a result of an activity permitted by the Corps. These guidelines are for permit applicants and others in meeting the requirements of Section 404(b)(1) Guidelines of the Clean Water Act. Compensatory mitigation is required to offset impacts that cannot be avoided and minimized to the extent practicable. The purpose of these Mitigation Guidelines is to identify the types and extent of information that Corps personnel in the Detroit District require to assess a mitigation proposal. Success is generally defined as: a healthy sustainable wetland/water/stream that compensates for the lost functions of the impacted water in an appropriate landscape/watershed position.

If applicants are contemplating mitigation in Michigan please review the Michigan Department of Environmental Quality's (MDEQ) Technical Guidance for Wetland Mitigation which provides wetland mitigation requirements associated with issuance of permits under Part 303, Wetlands Protection of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. On the web, visit www.michigan.gov/deq (Water, then Wetlands Protection and then Wetland Mitigation). In Indiana, contact the Indiana Department of Environmental Management (IDEM) (Andrew Pelloso, 317.233.2481) or on the web at www.in.gov/nrc/policy/wetlands.html. State mitigation requirements are in addition to the federal compensatory mitigation requirement.

To adequately compensate for unavoidable adverse impacts, we will generally require mitigation at a ratio, on a unit area basis, greater than 1:1. The mitigation ratio will be based on the functions and values of the impacted aquatic resource, the uncertainty of success, and the distance and type of wetland proposed for mitigation, and the function and value relationship between the impact and mitigation sites.

The responsibility for design, construction, and success rests solely with the applicant. The applicant is ultimately responsible if the effort is somehow not successful. Furthermore, the Corps will not release the applicant from the permit obligations until the mitigation project attains the goals stated in the approved mitigation plan.

The final submission of all mitigation and monitoring plans should be in a single document. The document should contain up-to-date versions of all material even if other versions were submitted in the application process. The plan must be site-specific rather than conceptual, and be accompanied by a complete set of construction drawings and associated specifications. For information required in submission of a proposed mitigation plan, please see Appendix A. Appendix C and D contain the Mitigation Plan Checklist in an outline format.

In October 2008 the Corps released Regulatory Guidance Letter (RGL) No. 08-03, which concerns "Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources". This RGL may be found on the web at:

<http://www.usace.army.mil/cw/cecwo/reg/RGL%2008%2003%20Monitoring%20Reports.pdf>

RGL 08-03 contains background on mitigation performance standards, monitoring timeframes, and

monitoring reports. *RGL 08-03 specifies types and amounts of information that may be submitted in mitigation monitoring reports and discourages “the submittal of large, bulky reports that provide general information”.* RGL 08-03 notes it “provides the Districts and regulated public guidance on minimum monitoring requirements for compensatory mitigation projects, including the required minimum content for monitoring reports.” These Guidelines have been updated to abide by and complement the guidance in RGL 08-03.

II. Mitigation Goals and Objectives

The goals of mitigation must be clearly stated in the mitigation plan. The basic objective of compensatory mitigation is the functional replacement of the functions and values of aquatic sites, whether the impacted sites are wetlands, streams, or open bodies of water. Not to be overlooked, however, is that the site selected for mitigation currently provides functions that will be lost in the mitigation conversion effort. Thus, all mitigation plans should clearly define the net exchange of those aquatic functions and values that would be lost at the impact site and at the mitigation site and what functions and values that would be gained through implementation of the mitigation plan. If there is a time lag between the impact and construction of compensatory mitigation, these temporal losses of aquatic functions should also be included, as well as justification for this time lag.

The Goals and Objectives section of any compensatory mitigation proposal must include a narrative description of the project clearly outlining: the scope of all aquatic functions lost at the proposed impact site; the scope of all aquatic functions to be gained at the compensatory mitigation site; and the overall watershed and/or regional improvements to be gained in the net exchange of functions to be lost compared to functions to be gained, including a discussion of the mitigation site’s proximity to areas of regional ecological significance, refuges, buffers, green space, habitat for fish and wildlife, especially listed species, or species with acknowledged state or regional special concern. The narrative should also discuss how the aquatic functions to be gained would help meet local and regional watershed or waterway management goals.

Functional assessments should use aquatic site evaluation techniques that are generally accepted by experts working with the relevant type of aquatic system. Further, proposals for mitigation should consider the landscape context of the impact and mitigation sites and reflect established priorities in local watershed planning efforts.

Streams: - Increasingly, the Corps is requiring replacement of stream habitat functions and values in mitigation plans. Considerable historical impacts to streams include channelization, impoundment, and enclosure in stormwater drains. Functional assessments where appropriate should include a rationale for how the technique is relevant to the habitat types found at the impact site and at the mitigation site. Stream assessment methods known to us include the Michigan Department of Natural Resources, Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers, and the State of Ohio, Quality Habitat Evaluation Index now being used in Indiana. In addition, applicants should consider measures to reduce impacts from erosion, sedimentation and loss of aquatic habitat for projects. The Indiana Department of Natural Resources, Indiana Drainage Handbook (http://www.in.gov/dnr/water/surface_water/DrainageHandbook/) is a useful source for design information, including conservation measures in small streams. Measures taken should enhance local water quality, flood management, and fish habitat goals.

Stream Assessments:

Meador, M.R., Hupp, C.R., Cuffney, T.F., and Gurtz, M.E., 1993, Methods for characterizing stream habitat as part of the National Water-Quality Assessment Program, U.S. Geological Survey Open-File Report 93-408.

Michigan Department of Natural Resources (MDNR), 1991, Great Lakes and Environmental Assessment Section (GLEAS) procedure 51, revised June 1991 - Qualitative biological and habitat survey protocols for wadable streams and rivers: Surface Water Quality Division

State of Ohio Qualitative Habitat Evaluation Index (QHEI): <http://tycho.knowlton.ohio-state.edu/qhei.html>

Open water: - Where compensation is deemed appropriate for replacement of lost functions of deep water habitats, the mitigation plan goals need to clearly specify the scope of the lost functions and show how the proposed mitigation would replace them. In recent years, the District has been presented with several large-scale proposals that would displace many acres of lake bottom in Great Lakes harbor areas and in inland lakes. The District has also evaluated many proposals for salvage of logs from historic logging operation areas covering multiple square miles of Great Lakes bottomlands. Log recovery proposals could potentially include many drowned river mouth lakes associated with the Great Lakes as well as long reaches of rivers flowing into the Great Lakes or other navigable lakes. The range of aquatic functions that could be lost from large projects will vary from project to project, but are likely to include loss of fish spawning habitat, nursery habitat for juvenile fish, loss of littoral zone habitat and nutrient processing functions.

Wetlands: - Compensatory mitigation is required for unavoidable adverse impacts to the wetland resource. Mitigation cannot simply be used to offset the acreage of wetland losses, but must also address the loss of functions and values. Our regulations and guidance encourage the restoration of former wetland areas (*e.g.*, wetlands that were drained, diked, filled) at or near the impact site over the creation of wetlands from uplands. Such restoration usually involves the reintroduction of hydrology to the site or removal of fill from the site. Because wetland topography, geology, soils, and vegetative seed bank are typically present on a restoration site, the chances of realizing successful mitigation are much greater with restoration than with creation. Landscape-level wetland functions are already in place on most restoration sites. Also, when considering restoration options, a broad watershed perspective is important. As such, restoration fits with the goals of the Clean Water Act more so than creation and generally requires a lower replacement ratio.

If a proposed project complies with the 404(b)(1) Guidelines and is not contrary to the public interest *and* if the functions and values of the impacted aquatic resource are considered high, the project may be permitted but with a substantially increased compensation ratio. It may be appropriate and practicable to replace different functions at more than one location. For example, we may require floodwater detention replacement on site and habitat replacement at an off-site location. On-site mitigation is preferred to satisfy the in-place mitigation goals. Finally, if it is not appropriate or practicable to replace “in-kind” a certain wetland type or suite of functions, we may accept “out-of-kind” restoration or creation of wetlands that have been important for a watershed

and/or eco-region, but which have suffered heavy historical loss since settlement. We must be convinced that such a trade-off would be best for the overall aquatic environment.

A. Wetland Type

1. Provide a written narrative describing the existing ecological characteristics of both the wetland impact site and the mitigation site using the Cowardin system (Cowardin, et. al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31). Provide a similar description for the target wetland community (e.g., palustrine forested wetland, sedge meadow, etc.).

B. Wetland Functions and Values

1. Describe the *existing* wetland functions and values at the impact site and the functions and values that will result from the mitigation. Examples of wetland functions include: groundwater recharge/discharge; sediment/toxicant retention; fish and wildlife habitat and diversity; and floodwater storage, etc. Examples of wetland values include recreational use and aesthetic quality.
2. Mitigation efforts may not achieve the performance standards if the landscape design is not integrated with the appropriate site water management. On-site mitigation is preferred to satisfy the in-place mitigation goals. A protected hydrological source is essential and should be considered while developing the plans. However, if the site cannot be developed without radical modifications to the landscape and/or does not contain hydrology such that on-site mitigation is likely to succeed, then off-site mitigation is a viable alternative. Under certain circumstances, off-site mitigation may be beneficial to the overall aquatic environment within the watershed. The location for off-site mitigation needs to be carefully selected and is subject to Corps of Engineers' approval. Priority will be given to sites that best protect the aquatic resource, and may include:
 - i. land identified for aquatic restoration in a watershed management plan or a greenway corridor plan;
 - ii. land up-gradient to existing resources of value that need wetland restoration for protection against sedimentation and water quality degradation. This includes land suitable for ecosystem restoration purposes; and
 - iii. land identified for acquisition, preservation, and restoration by public agencies or other not-for-profit groups committed to its management in perpetuity.

III. Identification of Wetlands and Waters of the United States

The most important design factor for mitigation is attaining and maintaining appropriate hydrological conditions. Applicants should be aware that restoration of former wetlands is much more likely to succeed than wetland creation. A good mitigation design selects an appropriate site and takes into consideration all relevant multi-disciplinary factors that affect self-sustaining

ecological systems. A historically impacted site is preferred for mitigation. Relevant factors include, but are not limited to: incorporating existing or planned upland buffers of native plant communities; landscape context of the aquatic resource; presence of soils with suitable texture; use of areas adjacent to existing wetlands; side slopes or other slopes affecting water levels at the site; establishment of corridors linking mitigation sites with existing natural areas; presence of native, non-invasive species seedbank; and an available long-term protection and management agency (*e.g.* government agency, land conservancy). Climate can impact hydrologic issues, sediment transport factors and other factors affecting attainment of desired functions, therefore applicants need to account for it in mitigation plans, including local and regional variability and extremes.

The following is *required* for a mitigation plan to be considered complete:

A. Physical attributes of sites.

1. Describe location and existing unaltered conditions, including rationale for choice. Indicate distance from project if offsite.
2. Provide the following documentation:
 - i. Copy of U.S.G.S. quad map with proposed mitigation location outlined and clearly identified in black and white;
 - ii. Site location map showing established roads;
 - iii. Base topographic map with proposed mitigation site(s) outlined and acreage indicated and fixed reference points (refer to Appendix A for figure format information);
 - iv. Development plan (where site is located within the development, indicating lots, lot numbers, roads);
 - v. Construction documents (grading, planting plan, *etc.*);
 - vi. Soil survey and National Wetlands Inventory (NWI) maps; and
3. Identification of existing wetlands and other waters of the U.S.
 - i. Identify all existing wetlands and other waters of the U.S. on the mitigation site. Provide a base topographic map of the site identifying these areas (and any proposed fill). Data forms from the 1987 Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1 with electronic updates, see Appendix B) and site plans must accompany the completed delineation report.

4. Zoning

- i. Give all present and proposed zoning designations for the proposed mitigation site and adjoining properties.

5. Hydrological Regime

- i. indicate source(s) of water;
- ii. depict discharge points;
- iii. note sites affected by seasonal flooding;
- iv. depict direction(s) of flow;
- v. indicate size of watershed (provide map); and
- vi. provide seasonal hydrograph.

Note: Irrigation may be utilized for establishment of a new mitigation site but cannot be used for its permanent hydrological source.

B. Past, Present and Proposed Uses of All Adjacent Areas

Briefly describe all known past, present and proposed uses of the properties adjacent to the proposed mitigation site, including potential hydrological changes.

IV. Mitigation Site Selection and Justification

Available data should clearly justify the selected mitigation site. Briefly describe similarities between the approved mitigation plan and any natural or control wetlands in the surrounding area. Emphasize the existing and proposed hydrophytic vegetation, soils, and target hydrology. The mitigation proposal should also define the expected likelihood of success based on future land compatibility. Justification for the proposed mitigation site and control wetland should be incorporated and defined in the appropriate sections, with emphasis on the existing and proposed site conditions.

If any previously unknown historic or archeological remains are discovered while mitigating a permit, the permittee must coordinate with the State Historical Preservation Officer to insure the mitigation plan will not impact historic or prehistoric tribal or cultural resources.

V. Mitigation Work Plan

The following is *required* for a mitigation plan to be considered complete:

A. Timing of Mitigation

1. Indicate the timing of mitigation: before, concurrent 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. Site Preparation

Provide detailed plans for the following:

1. Grading

- i. Indicate existing and proposed elevations. Provide base topographic maps showing planned site preparation (Refer to Appendix A for figure format information);
- ii. Describe plans for establishing appropriate microtopography. Reference wetland(s) can provide design templates;
- iii. Provide representative cross-sections of the mitigation site with elevations, north arrow, and scale. Include measurements from fixed reference points.

2. Soils

- i. Existing and proposed soil series and profiles (include hue, value and chroma for each horizon. Indicate whether or not the surface has been scraped off, previously filled, tilled, plowed, *etc.* Note which soil color chart is utilized (*e.g.*, Munsell or Earth Colors) and the publication date of the chart.
- ii. Source of soils. Identify the original source of any soil transported to the mitigation site (*e.g.*, existing soil, imported impact site hydric soil). Soil origin is important if the applicant is proposing to use the seed bank from an impacted wetland. Indicate the target soil characteristics (organic content, structure, texture, permeability), soil amendments (*e.g.*, organic material or topsoil). Identify which horizon, “A” (containing roots/seeds), “B”, or “C” is being brought onto the site.
- iii. Erosion, bank stabilization, and soil compaction control measures.

3. Hydrological Regimes

- i. Indicate size of watershed (provide map).
- ii. Indicate source(s) of water.
- iii. Indicate connections to existing waters.
- iv. Depict discharge points.
- v. Existing monitoring data, if applicable; indicate location of monitoring wells and stream gauges on site map.
- vi. Potential interaction with groundwater.
- vii. Storm hydrograph and note areas affected by seasonal flooding.
- viii. Depict direction(s) of flow.
- ix. Existing and planned hydroperiod (seasonal depth, duration, and timing of inundation and saturation), percent open water, and water velocity and direction(s) of flow(s).
- x. Stream or other open water geomorphic features (*e.g.*, substrate, channel width and depth, bankfull discharge, sinuosity, riffles, pools, instream structures, aquatic habitat features, bioengineering techniques for stream banks, and riparian vegetation and buffers).
- xi. Provide a justification for the use of such water control structures. Indicate location and provide details of water control structures. Explain their maintenance in the “Site Protection and Maintenance” section.
- xii. Provide hydrological tables illustrating the current and projected water levels for the mitigation site.
- xiii. Provide an irrigation plan, if applicable.
 - a. Describe irrigation method(s) and estimated frequency of application and projected amounts during dry months.
 - b. Indicate water source(s) irrigation water for mitigation site. Sprinklers can only be used temporarily and not as a principal source of hydrology.
 - c. Show planned irrigation system and/or water flow on base topographic map (may include on planting plan map).

Note: *Hydrology must be self-sustaining after two consecutive years.* Irrigation may be utilized for establishment of a new mitigation site but cannot be used for its permanent hydrological source.

4. Vegetation

- i. The planting plan and methods must be described in the proposed mitigation plan. The following information must be incorporated into the planting plan:
 - a. Provide a table of species to be planted, including numbers, spacing, types of propagules, plant age(s)/pot sizes, *etc.* Formal or scientific and common names must be used, as well as the appropriate indicator status for each species. Use the current regional U.S. Fish and Wildlife Service National List of Plant Species that Occur in Wetlands (Region 3 – North Central), (<http://wetlands.fws.gov/bha/list88.html>);
 - b. To support the success of a mitigation plan, it is necessary to identify the genetic population from which the materials are taken. Therefore, we require that the plan indicate source-locale (Township and Range) of seeds, plant plugs, cuttings, *etc.* Only native plant species may be used for the mitigation site. Hydrophytic vegetation may not consist of exotic or hybrid nursery species;
 - c. Show planting locations on a base topographic map according to species. (See Appendix A for figure format information.) The map must include elevations and proposed water levels. Demonstrate that the appropriate plant species are growing in suitable areas;
 - d. Describe the target vegetative community(ies) using the Cowardin classification system Cowardin system (Cowardin, et. al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31) or a similar classification system (*e.g.*, palustrine forested wetland, standing water marsh, sedge meadow, wet prairie, *etc.*) Map the location(s) of the different communities and provide an estimate of the acreage of each community to be created/restored.
 - e. Indicate plant spatial structure-quantities/densities, percent cover, community structure (*e.g.*, canopy stratification);
 - f. If transplanting is proposed, provide the location from which the plants were obtained and describe storage method(s) and duration;
 - g. Describe any expected volunteer native vegetation that is expected to occur in the mitigation site as part of the mitigation plan. Annual monitoring reports should include a listing of any new species that have appeared unexpectedly during the last year and a discussion of whether or not corrective action is needed regarding these species; and

- h. If a temporary grass seed mix is used on the mitigation site, identify the species composition of the mix, as well as any methods for eventually removing the temporary ground cover, if required.

5. Other

- i. Planned habitat features. Identify large woody debris, rock mounds, *etc.*, on the mitigation site plan.
 - ii. Planned buffer. Identify on the mitigation site plan.
 - a. Provide an evaluation of buffer's expected contribution to aquatic functions.
 - b. Provide physical characteristics of the buffer, *i.e.*, location, dimensions, native plant composition, spatial and vertical structure, *etc.*
 - iii. The approved mitigation site must be adequately field marked with permanent signs identifying the mitigation boundaries.
 - iv. Other planned features, such as interpretive signs, trails, fence(s), *etc.*
6. Construction methods. Provide a description of equipment to be used, site access control, and other damage control.
- i. Describe control methods for construction traffic entering and exiting the site.
 - ii. Describe signage to be used during construction to keep the site clear of trespassers.
 - iii. Describe any fencing to be used to delineate and/or protect the mitigation site.

C. Schedule

Time frames should be clearly documented within the proposal, as well as implementation of the monitoring plan. The applicant should be aware that completion of the initial planting does not automatically constitute the first monitoring year of the monitoring plan. **The monitoring plan is begun once a full growing season has elapsed from installation of the last planted material.**

D. As-Built Conditions

The plan must specify that the applicant will:

- 1. Submit a report, including complete construction documents, to the Corps within six (6) weeks of completion of site preparation and planting, describing as-built status of the mitigation project. Include any deviations from the approved plan and justification of those deviations. Submit separate reports for grading and planting

work if not completed within six weeks of each other. *Initial planting reports and final construction plans are required, but will not be considered as a monitoring report.*

2. Provide topographic maps showing as-built contours of the mitigation site. Indicate location of plantings and any other installations or structures.

VI. Performance Standards

Final success criteria are proposed by the applicant for Corps approval and are used to determine completion of the permittee's mitigation responsibilities. Fulfillment of these criteria should indicate that the mitigation site is progressing towards the habitat type, functions, and values that constitute the long-term goals of this mitigation. RGL 06-03 provides broad guidance on mitigation performance standards.

The type of ecosystems or habitats created or restored by mitigation will dictate the length of the monitoring period. Emergent or aquatic systems will require monitoring for three to five years. Ecosystems or habitats that include a scrub-shrub component require monitoring no less than five years. Mitigation sites that encompass a forested component require ten years of monitoring. Specifically, the ten years of monitoring require seven years with field visits during years one through four, six, eight and ten. The entire mitigation site must be monitored at each field visit.

For mitigation plantings, final success criteria will not be considered complete until a minimum of two (2) consecutive years after all human support has ceased and the mitigation site has successfully reached the mitigation goals for each of these years. Examples of human support include irrigation, replanting, rodent control, invasive species control, and fertilization.

1. Factors for Final Success Criteria

1. Percent vegetation cover and/or density
 - i. The mitigation site must be vegetated at least 70% (areal cover for all stratum) by hydrophytic, native, non-invasive species and no more than 10% of the site may be open water, bare ground or a combination of the two.
2. Plant species diversity
 - i. The diversity of the plant community within the mitigation site must be measured. Determine species evenness (relative abundance of individuals among all species present) and species richness (total number of species observed within the mitigation site) for each monitoring period.
 - ii. Calculate the diversity of the site by a known, accepted diversity index. Although all diversity indices have at least some deficiency, they are still a useful means to evaluate the diversity of a community. The diversity index to

be used must be clearly defined and justified in the report. The calculated index score should fall within the accepted range for the diversity index. In addition, the diversity index cannot be lower than that of the impact site for the mitigation site to be deemed successful, presuming the site is in-kind mitigation. Diversity index scores are to be stable or increasing in the two years before final acceptance of the mitigation.

- iii. Floristic Quality Assessment (FQA) is recommended for evaluating the plant community structure. This would include two types of measurements for a site. The first measurement is for the entire site, yielding species richness, average conservatism of species and a Floristic Quality Index (FQI). The second set of measures are completed at specific plots along transects and provide relative frequency, relative dominance and importance values for species along the transect. The FQI success criteria should include species richness, mean conservatism, and FQI values equal to or exceeding those at the impact site. Scores should be stable or increasing in the two years prior to final acceptance of the mitigation site. (References for FQA include Taft, John B., Wilhelm, Ladd, and Masters. 1997. Floristic Quality Assessment for Vegetation in Illinois; A Method for Assessing Vegetation Integrity. *Erigenia*, Number 15, pp. 3-95 and Herman, K.D., Masters, Penskar, Reznicek, Wilhelm, and Brodowicz. 1996. Floristic Quality Assessment with Wetland Categories and Computer Application Programs for the State of Michigan. Michigan Department of Natural Resources, Wildlife Division, Natural Heritage Program, Lansing.)

3. Realization of targeted vegetative communities and/or habitat types

- i. A comparison of the targeted acreage and the realized acreage of the communities and/or habitats must be provided. Differences greater than 15-20% may necessitate corrective measures (e.g., replanting, alteration of hydrology).

4. Soil must support targeted vegetation.

5. Hydrology

- i. All sites must, at a minimum, demonstrate sufficient evidence of wetland hydrology to meet the hydrology criteria of the Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1 with electronic updates) for the delineation of wetlands. We will require direct evidence of the mitigation site's hydrological conditions (*i.e.*, the "primary indicators" listed in the 1987 Manual). Indirect evidence (*i.e.*, "secondary" indicators in the 1987 Manual), in most cases, cannot be used as a reliable indicator in most restored or created wetlands. For example, the FAC-neutral test is an inappropriate measure of site hydrology in a recently-created wetland because the hydrophytic vegetation on site has been planted and does not represent vegetation that is displaying patterns of adaptation and succession in response to long-established hydrological conditions. Wetland hydrology is to be demonstrated in "more years than

not.” This test must be passed and a site will not be accepted as successful if a period of dry years brings this into question.

- ii. Appropriate hydrology for the target habitats or communities is to be demonstrated in more years than not. As stated in criterion 3i above, we may require corrective measures if the acreage of one or more target communities differs substantially (more than 15-20%) from the acreage proposed in the Mitigation Plan. *Please note, it is possible to fully meet condition 5i while failing to meet this condition—failure to meet both hydrology conditions will normally require the undertaking of corrective measures.*

6. Exotic and undesirable species.

Certain exotic and/or undesirable species must not be present in the mitigation site. Examples of such species include, but are not limited to: Garlic Mustard (*Alliaria petiolata*); Panicked Aster (*Aster simplex*); Barnyard Grass (*Echinochloa crusgalli*); Purple Loosestrife (*Lythrum salicaria*); Eurasian Water Milfoil (*Myriophyllum spicatum*); Reed Canary Grass (*Phalaris arundinacea*); Common Reed (*Phragmites australis*); and Glossy Buckthorn (*Rhamnus frangula*). If an undesirable species is found within the mitigation site, it must be removed and a management plan must be created to prevent the re-introduction of the undesirable species.

7. Wetland delineation.

A wetland delineation, including a certified land survey of the boundary, must be submitted for Corps approval, and verified by the Corps prior to release of the mitigation site. The acreage of the delineated area must be equal to or greater than required acreage (refer to the 1987 Corps of Engineers Wetland Delineation Manual Technical Report Y-87-1 with electronic updates).

VII. Site Protection and Maintenance

A. Responsible Parties

1. Give name(s), title(s), address(es), and phone numbers of person(s) responsible for implementing the mitigation project, including person(s) responsible for supervising or providing biological monitoring.
2. The property owner must be clearly identified as one of the responsible parties. Written agreements will be required to ensure that the property owner will allow the construction and preservation of the mitigated wetland.
3. Ownership Status:

- i. Indicate who presently owns the proposed mitigation site. Availability of property must be clearly defined prior to final review. All easements and/or encroachments located on the proposed mitigation site must be identified. The mitigation site should be owned by the applicant prior to issuance of the Corps permit. The mitigation site should not be constructed on public lands unless the landowner is the responsible party;
- ii. Indicate expected ownership of the mitigation site following completion of the mitigation project. The responsible party for long-term management and protection of the site must also be identified. A signed management agreement must be submitted if an entity other than the applicant will assume management responsibilities following completion of the mitigation project; and
- iii. Indicate what entity, if any, controls the water flow and the water control structures to and/or from the site. Arrangements must be made by the applicant that guarantees sufficient hydrology in the mitigation site during and after the establishment of the mitigation project. The agreement must be in writing and submitted to the Corps for review.

B. Long Term Protection and Management Plan

1. Describe plan for permanent property protection. Submit a long term management plan description, if available (*e.g.*, conservation easement, deed restriction, transfer of title).
2. All mitigation required by Corps permits is permanent unless otherwise noted in the permit document. The Corps may take enforcement action even after the identified monitoring period has ended.

C. Maintenance Plan and Schedule

1. Describe planned maintenance activities including, but not limited to:
 - i. irrigation methods (see note on irrigation in Section V,B,3, xiii);
 - ii. plant replacement;
 - iii. weeding;
 - iv. invasive species identification and eradication;
 - v. water structure inspection;
 - vi. fertilization;
 - vii. erosion control
 - viii. herbivore protection;

- ix. controlled burns; and/or
- x. other maintenance activities.

VIII. Monitoring Plan

The monitoring plan is subject to Corps approval and is used to determine the responsibilities of the permittee. Monitoring is a basic requirement for all mitigation plans accepted by the Corps. The monitoring plan is used to determine if and when a compensatory mitigation site has achieved the proposed yearly and final success criteria. In addition, monitoring enables the assessment of the mitigation and identifies the need to implement corrective measures.

A. Responsible Parties

Identify party(ies) responsible for completing the monitoring. If more than one, identify primary party.

B. Required Monitoring Methods

1. Description of proposed monitoring methods must be provided. Include monitoring schedule, sample sizes, justification for sampling schemes, and data analyses to be performed.
2. Permanent sampling transects must be established, plotted on mitigation project drawings, and identified at the mitigation site(s). These transects must represent all plant communities within the mitigation sites.
3. The methods will include sampling schemes for vegetation, soil and hydrology within the mitigation sites. In addition, exotic species surveys and planted species survival rates are required.
4. Vegetation monitoring must begin at the established sampling points in the next growing season following the initial planting. At least one inspection must occur per monitoring year for the life of the required monitoring period to document hydrology, vegetation and soils. In addition, for two of the monitoring years, but not during Year 1, hydrology must be documented two times, at least 60 days apart. Only one report per monitoring year is required regardless of the number of inspections.
5. Acreage estimates of each habitat type and/or vegetative community found on the mitigation site must be provided. The acreage of all of the targeted as well as “non-targeted” vegetative communities/habitats must be provided and the location of these communities must be indicated on a map of the mitigation site
6. Provide samples of all proposed data sheets.

7. Photographs may be taken during each monitoring period from the same vantage point and in the same direction every year. RGL 06-03 states: “submitted photos must fit on a standard 8.5” x 11” piece of paper, dated, and clearly labeled with the direction from which the photo was taken. The photo sites must also be identified on the appropriate maps.” Per RGL 06-03, photographs are to be submitted as part of the 4-page maximum Summary Data portion of the monitoring report.
8. In order to ensure comparable assessments, continuity of monitoring methodology must be maintained.

C. Optional Monitoring Methods

Additional parameters may be monitored to adequately assess the developing mitigation site. Examples of such parameters include:

1. Growth rates for herbaceous vegetation, trees and/or shrubs;
2. Wildlife surveys;
3. Amphibian surveys;
4. Macroinvertebrate sampling; and
5. Water quality.

D. Annual Reports

1. Monitoring reports shall assess both the attainment of yearly target criteria and progress toward final success criteria. Reports must be submitted to the Corps no later than December 31. For annual reports received by the Corps between September 1 through December 31, field verification will be accomplished the *following year*. If the monitoring report is submitted early, then it will be verified that growing season. December 31 is the last date to submit the annual report. Copies of all field data sheets may be required to adequately assess the monitoring reports.
2. Recognizing that the summer is a busy time, the Corps will accept a draft monitoring report submitted by August 31 for purposes of meeting the deadline for field verification activities. However, the final report must still be submitted by the December 31 deadline, and the information contained therein should be essentially the same as that in the draft submittal.

3. RGL 08-03's format for submitting reports is provided below:

i. Project Overview (1 page)

- (1) Corps Permit Number or Name of the Mitigation Bank or In-Lieu Fee Project
- (2) Name of party responsible for conducting the monitoring and the date(s) the inspection was conducted.
- (3) A brief paragraph describing the purpose of the approved project, acreage and type of aquatic resources impacted, and mitigation acreage and type of aquatic resources authorized to compensate for the aquatic impacts.
- (4) Written description of the location, any identifiable landmarks of the compensatory mitigation project including information to locate the site perimeter(s), and coordinates of the mitigation site (expressed as latitude, longitudes, UTM's, state plane coordinate system, etc.).
- (5) Dates the compensatory mitigation project commenced and/or was completed.
- (6) Short statement on whether the performance standards are being met.
- (7) Dates of any recent corrective or maintenance activities conducted since the previous report submission.
- (8) Specific recommendations for any additional corrective or remedial actions.

ii. Requirements (1 page)

List the monitoring requirements and performance standards, as specified in the approved mitigation plan, mitigation banking instrument, or special conditions of the DA permit, and evaluate whether the compensatory mitigation project site is successfully achieving the approved performance standards or trending towards success. A table is a recommended option for comparing the performance standards to the conditions and status of the developing mitigation site.

iii. Summary Data (maximum of 4 pages)

Summary data should be provided to substantiate the success and/or potential challenges associated with the compensatory mitigation project. Photo documentation may be provided to support the findings and recommendations referenced in the monitoring report and to assist the PM in assessing whether the compensatory mitigation project is meeting applicable performance standards for that monitoring period. Submitted photos should be formatted to print on a standard 8 ½" x 11" piece of paper, dated, and clearly labeled with the direction from which the photo was taken. The photo location points should also be identified on the appropriate maps.

iv. Maps and Plans (maximum of 3 pages)

Maps should be provided to show the location of the compensatory mitigation site relative to other landscape features, habitat types, locations of photographic reference points, transects, sampling data points, and/or other features pertinent to the mitigation plan. In addition, the submitted maps and plans should clearly delineate the mitigation site perimeter(s), which will assist PMs in locating the mitigation area(s) during subsequent site inspections. Each map or diagram should be formatted to print on a standard 8 1/2' x 11" piece of paper and include a legend and the location of any photos submitted for review. As-built plans may be included.

v. Conclusions (1 page)

A general statement should be included that describes the conditions of the compensatory mitigation project. If performance standards are not being met, a brief explanation of the difficulties and potential remedial actions proposed by the permittee or sponsor, including a timetable, should be provided. The District Commander will ultimately determine if the mitigation site is successful for a given monitoring project.

4. General

- i. Any vegetation data submitted will include scientific name, common name and wetland indicator status. (See National List of Plant Species that Occur in Wetland Region 3 – North Central.) (<http://wetlands.fws.gov/bha/list88.html>) If available, note habitat symbols.

IX. Adaptive Management Plan

A. Identify party(ies) and responsibilities

- 1. An adaptive management plan must be included in the mitigation plan, identifying the party(ies) and responsibilities of all parties. The responsible party for long-term management and protection of the site must be identified.
- 2. A signed management agreement must be submitted if an entity other than the applicant will assume management responsibilities following completion of the mitigation project.
 - i. The property owner must be clearly identified as one of the responsible parties.

- ii. This agreement must be in writing and submitted to the Corps for review.
3. All mitigation required by Corps permits is permanent unless otherwise noted in the permit document. The Corps may take enforcement action even after the identified monitoring period has ended if filling, draining, or dredging of the mitigation site occurs.

B. Identification of Potential Challenges

1. Identify the potential challenges to the mitigation plan such as flooding, drought, invasive species, seriously degraded conditions, adjacent property problems, animal/waterfowl degradation to planted species, *etc.*, that will pose a risk to the mitigation success.
2. Discuss how the mitigation plan accommodates these challenges along with potential remedial measures in the event that mitigation does not meet performance standards in a timely manner.
 - i. For example, will there be degradation of the mitigation by muskrats or waterfowl? If so, what methods are proposed to protect the newly planted species? Indicate what entity, if any, controls water flow and the associated water control structure(s) onto, or off of, the mitigation site.
 - ii. Arrangements must be made by the applicant that guarantees a sufficient water supply to sustain the mitigation wetland based upon the permitted design specification.
3. The mitigation plan must identify the methods proposed to prevent the introduction and establishment of invasive species, as well as methods proposed to eradicate and control such species.
4. The following hydrophytic species must be excluded from the mitigated wetland during the management phase:

- | | |
|-----------------------------------|------------------------|
| i. <i>Alliaria petiolata</i> | Garlic Mustard |
| ii. <i>Aster simplex</i> | Panicled Aster |
| iii. <i>Echinochloa crusgalli</i> | Barnyard Grass |
| iv. <i>Lythrum salicaria</i> | Purple Loosestrif |
| v. <i>Myriophyllum spicatum</i> | Eurasian Water Milfoil |
| vi. <i>Phalaris arundinacea</i> | Reed Canary Grass |
| vii. <i>Phragmites australis</i> | Common Reed |
| viii. <i>Rhamnus frangula</i> | Glossy Buckthorn |

C. Remedial Measures

Corrective actions may be required if a mitigation site is not fully successful. Describe procedures to allow for modifications of performance standards if the mitigation project has unanticipated changes or time limits cannot be met.

X. Financial Assurances

A. Identify Responsibilities

Identify the part(ies) responsible to establish and manage the financial assurance, the type of financial instrument, release and forfeiture conditions and schedule for mitigation phases including, but not limited to: construction; maintenance; monitoring; remedial measures; and mitigation success. Costs may be incurred to replace or repair structures on the site or to manage the mitigation site.

B. Types of assurances

Financial assurances may be required for projects with large mitigation sites or if the likelihood of success appears to be quite low. The applicant/owner may be required to secure a performance bond held by an approved surety, a letter of credit or other financial assurance to ensure that a mitigation project is constructed, operated, monitored, and maintained in accordance with the permit. Financial assurances are intended so that funds will be available to provide for monitoring, management and maintenance of the mitigation site or if there is damage to the site or a structure on site.

C. Schedule

Financial assurance will be reviewed and adjusted to reflect current economic factors.

APPENDIX A

REQUIRED INFORMATION

I. Text format notes for mitigation/monitoring proposals and as-built report. (Annual reports must follow format in RGL 06-03).

- A. The report must include the Corps file number, the dates of the fieldwork and the monitoring year.
- B. The report must include a distribution page listing names, titles, companies/agencies and addresses of all persons/agencies receiving a copy of the report.
- C. Mitigation goals and objectives. Describe the functions lost at the impact site and the functions to be gained at the mitigation site. In addition describe the overall watershed improvements to be gained for this proposed mitigation project.
- D. See Appendix C, Compensatory Mitigation Plan Checklist, for information required in the mitigation proposal.

II. List of figures to be submitted.

- A. Mitigation and monitoring proposal:
 - 1. Jurisdictional acres and proposed fill on *mitigation* site (outlines and acreage indicated);
 - 2. Location and size of mitigation site, including, but not limited to:
 - i. Road map/vicinity map;
 - ii. U.S.G.S. quad map;
 - iii. Site location map; and
 - iv. Reference measurements from a fixed point.
 - 3. Jurisdictional areas and any proposed fill on *mitigation* site;
 - 4. Mitigation site preparation; (including, but not limited to the following):
 - i. Plan view on base topographic map;
 - ii. Representative cross-sections;
 - iii. Planting plan;
 - iv. Irrigation plan;
 - v. Hydrological regime; and
 - vi. Soil.

5. Soil survey map and National Wetlands Inventory (NWI) map.

- B. As-built construction documents, including, but not limited to:
 - i. Final site contours (grading plan); and
 - ii. Plantings as installed on grading plan.

III. Figure format notes

- A. All maps and plans submitted shall be legible and include title, date of preparation, date of submission and file number.
- B. A legend shall be provided for all symbols, patterns, or screens that are used on the map or plan.
- C. If colors are used to indicate areas on the original map, color copies shall be included in all copies of the report submitted to the Corps.
- D. Provide a north arrow and include a scale and datum.
- E. Scale and orientation shall be identified and the consistent for all maps, except for detail sections.
- F. Base topographic maps (*i.e.*, for jurisdictional areas, location and size of mitigation sites, mitigation site preparation plans, planting plans, irrigation plans, and as-built report) shall be full size. (1 inch = 100 feet or less, 1 inch = 200 feet for very large projects).
- G. If the soil is brought in from off-site, note this location with a vicinity map and site location map. Conversely, note on vicinity and site maps where the soil is to be taken if offsite.

Note: Reduced copies of maps (*i.e.*, 8.5" x 11") shall be included with all documents to facilitate review by advisory agencies. For Corps review, at least one set of a full-sized copy shall accompany mitigation and monitoring proposal.

IV. Legal Documentation

- A. Certificate of title to mitigation site.
- B. Letter of Credit or Performance Bond.
- C. Conservation Easement or Deed Restriction.
- D. Land Use Plan and Management Agreement.
- E. Third Party Agreements, if applicable.

APPENDIX B

DEFINITIONS

Adjacent – bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands."

Corps of Engineers Wetlands Delineation Manual - Environmental Laboratory. (1987). Technical Report Y-87-1 with electronic updates, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. Web site: <http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf>

Creation – the construction and establishment of a self-sustaining wetland of native hydrophytic plant species, and associated native wildlife, where uplands had previously existed.

Delineation – the process of determining the limits of wetlands using the Corps manual. It documents the location and extent of the wetlands with the field data supporting the placement of its limits.

Diversity Index – a mathematical derivation that describes species diversity at a site.

Floristic Quality Assessment (FQA) – A method for evaluating the floristic integrity of sites, based on the number of species present and each species “mean conservatism,” or likelihood to represent the indigenous nature of flora of a region.

Functions – the hydrological and biological characteristics of wetlands including: (1) habitat for fish, migratory birds and other wildlife, in particular at risk species; (2) protection and improvement of water quality; (3) attenuation of water flows due to flooding; (4) the recharge of ground water; (5) protection and enhancement of open space and aesthetic quality; (6) protection of flora and fauna; (7) sediment retention; and (8) nutrient export.

Growing season - The portion of the year when soil temperatures at 19.7 in. below the soil surface are higher than biologic zero (5 °C). For ease of determination this period can be approximated from climatological data given in most Soil Conservation Service (now called Natural Resources Conservation Service) county soil surveys (usually in Table 2 or 3 of modern soil surveys). The growing season starting and ending dates will generally be determined based on the 28 degree F or higher air temperature threshold at a frequency of 5 years in 10.

Hydric soil – soil that was formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of *hydric soils*. Also, soils in which the hydrology has been artificially

modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics.

Hydrophytic vegetation - The sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. When hydrophytic vegetation comprises a community where indicators of hydric soils and wetland hydrology also occur, the site has wetland vegetation.

Invasive species – A species that demonstrates rapid growth and spread, invades habitats, and displaces other species. Species that are prolific seed producers, have high seed germination rates, easily propagated asexually by root or stem fragments, and/or rapidly mature predispose a plant to be an invasive. Example: The Hybrid Cattail (Thypha x glauca), a cross between native cattails, is extremely aggressive and out-competes its parents and other native species when established. Alien species that are predisposed to invasiveness have the added advantage of being relatively free from predators (herbivores, parasites and disease) and can; therefore, expend more energy for growth and reproduction.

Mitigation – includes avoiding, minimizing, rectifying, reducing, or compensating for resource losses. This guidance policy focuses on restoration and creation of self-sustaining wetlands.

Native – species known to be historically natural and present at the location and habitat prior to mans' introduction of species to the area from other geographic sources.

Non-native – also referred to as alien, exotic or invasive species, refers to organisms that are not native to the geographic location and habitat. There is no component of harmfulness included, although non-native species often are harmful to the native populations.

Performance Standards – Observable or measurable attributes which are used to determine if a compensatory mitigation project meets its objective.

Restoration – means to re-establishing a setting or environment in which the natural functions of the pre-existing wetland recover.

Species evenness – a mathematical derivation that quantitatively describes the species diversity present on a sampling site.

Species richness – the number of different plant species present at a site.

Waters of the United States (definition is subject to modification) – include:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or

natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

- i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - iii. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
 5. Tributaries of waters identified in 1-4 of this section;
 6. The territorial seas;
 7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in 1-6 of this section.

Note: Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) that also meet the criteria of this definition) are not waters of the United States.

Wetlands - means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

APPENDIX C

MULTI-AGENCY COMPENSATORY MITIGATION PLAN CHECKLIST ¹

- I. Purpose**
- II. Mitigation Goals and Objectives**
 - A. Describe functions lost at impact site
 - B. Describe functions to be gained at mitigation site
 - C. Describe overall watershed improvements to be gained
- III. Baseline Information for Impact and Proposed Mitigation Sites**
 - A. Provide data on physical attributes of sites (soils, vegetation, hydrology)
 - B. Describe historic and existing land uses and resources impacted
 - C. Describe reference site attributes if available
- IV. Mitigation Site Selection and Justification**
 - A. Describe process of selecting proposed site
 - B. Likelihood of success, future land use compatibility, *etc.*
- V. Mitigation Work Plan**
 - A. Location
 - B. Construction Plan
 - C. Describe planned hydrology, vegetation, soils, buffers, *etc.*
- VI. Performance Standards**
 - A. Identify success criteria
 - B. Compare functions lost and gained at impact and mitigation sites
 - C. Describe soils, vegetation and hydrology parameter changes
- VII. Site Protection and Maintenance**
 - A. List parties and responsibilities
 - B. Provide evidence of legal protective measures
 - C. Maintenance plan and schedule
- VIII. Monitoring Plan**
 - A. Provide monitoring schedule, identify party (ies) and responsibilities
 - B. Specify data to be collected, including assessment tools and methodologies
- IX. Adaptive Management Plan**
 - A. Identify party (ies) and responsibilities
 - B. Remedial measures (financial assurances, management plan, *etc.*)

X. Financial Assurances

- A. Identify party (ies) responsible for assurances
- B. Specify type of assurance, contents and schedule

¹ Refer to “Supplement: Compensatory Mitigation Plan Checklist” for further explanation of specific checklist items.

APPENDIX D

SUPPLEMENT: COMPENSATORY MITIGATION PLAN CHECKLIST

This document is intended as a technical guide for Clean Water Act (CWA) Section 404 permit applicants² preparing compensatory mitigation plans. Compensatory mitigation is required to offset impacts that cannot be avoided and minimized to the extent practicable. 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). This checklist can be adapted to account for specific environmental conditions in different regions of the U.S.

I. Purpose

II. Mitigation Goals and Objectives

Impact Site

- A. Describe and quantify the aquatic resource type and functions that will be impacted at the proposed impact site. Include temporary and permanent impacts to the aquatic environment.

- B. Describe aquatic resource concerns in the watershed (*e.g.* flooding, water quality, habitat) and how the impact site contributes to overall watershed/regional functions. Identify watershed or other regional plans that describe aquatic resource objectives.

Mitigation Site

- C. Describe and quantify the aquatic resource type and functions for which the mitigation project is intended to compensate.

- D. Describe the contribution to overall watershed/regional functions that the mitigation site(s) is intended to provide.

² 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.

III. Baseline Information - for proposed impact site, proposed mitigation site & if applicable, proposed reference site(s).

- A. Location
 1. Coordinates (preferably using DGPS) & written location description (including block, lot, township, county, Hydrologic Unit Code (HUC) number, as appropriate and pertinent.
 2. Maps (*e.g.*, site map with delineation (verified by the Corps), map of vicinity, map identifying location within the watershed, NWI map, NRCS soils map, zoning or planning maps; indicate area of proposed fill on site map).
 3. Aerial/Satellite photos with photograph date.
- B. Classification – Hydrogeomorphic as well as Cowardin classification, Rosgen stream type, NRCS classification, as appropriate.
- C. Quantify wetland resources (acreage) or stream resources (linear feet) by type(s).
- D. Assessment method(s) used to quantify impacts to aquatic resource functions (*e.g.*, HGM, IBI, WRAP, *etc.*); explain findings. The same method should be used at both impact and mitigation sites.
- E. Existing hydrology
 1. Water budget. Include water source(s) (precipitation, surface runoff, groundwater, stream, *etc.*) and losses(s). Provide budgets for both wet and dry years.
 2. Hydroperiod (seasonal depth, duration, and timing of inundation and/or saturation), percent open water.
 3. Historical hydrology of mitigation site if different than present conditions.
 4. Contributing drainage area (acres).
 5. Results of water quality analyses (*e.g.*, data on surface water, groundwater, and tides for such attributes as pH, redox, nutrients, organic content, suspended matter, DO, heavy metals).
- F. Existing vegetation
 1. List of species on site, indicating dominants.
 2. Species characteristics such as densities, general age and health, and native/nonnative/invasive status.
 3. Percent vegetative cover; community structure (canopy stratification).
 4. Map showing location of plant communities.
- G. Existing soils
 1. Soil profile description (*e.g.*, soil survey classification and series) and/or stream substrate (locate soil samples on site map).
 2. Results of standard soils analyses, including percent organic matter, structure, texture, permeability.
- H. Existing wildlife usage (indicate possible threatened and endangered species habitat).

- I. Historic and current land use; note prior converted cropland.
- J. Current owner(s)
- K. Watershed context/surrounding land use.
 1. Impairment status and impairment type (*e.g.*, 303(d) list) of aquatic resources.
 2. Description of watershed land uses (percent ag, forested, wetland, developed).
 3. Size/Width of natural buffers (describe, show on map).
 4. Description of landscape connectivity: proximity and connectivity of existing aquatic resources and natural upland areas (show on map).
 5. 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).

IV. Mitigation Site Selection & Justification

- A. Site-specific objectives: Description of mitigation type(s)³, acreage(s) and proposed compensation ratios.
- B. Watershed/regional objectives: Description of how the mitigation project will compensate for the functions identified in Section II. Mitigation Goals.
- C. Description of how the mitigation project will contribute to aquatic resource functions within the watershed or region (or sustain/protect existing watershed functions) identified in Section II. Mitigation Goals. How will the planned mitigation project contribute to landscape connectivity?
- D. Likely future adjacent land uses and compatibility (show on map or aerial photo).
- E. Description of site selection practicability in terms of cost, existing technology, and logistics.
- F. If the proposed mitigation is off-site and/or out-of-kind, explain why on-site or in-kind options⁴ are not practicable or environmentally preferable.
- G. Existing and proposed mitigation site deed restrictions, easements and rights-of-way. Demonstrate how the existence of any such restriction will be addressed, particularly in the context of incompatible uses.
- H. Explanation of how the design is sustainable and self-maintaining. Show by means of a water budget that there is sufficient water available to sustain long-term wetland or stream hydrology. Provide evidence that a legally defensible, adequate and reliable source of water exists.

³ That is, restoration, enhancement, creation or preservation: see Regulatory Guidance Letter (RGL) 02-2, Mitigation RGL, for definitions for these terms. ⁴ See Federal Guidance on the Use of Off-Site and Out-of-Kind Compensatory Mitigation under Section 404 of the CWA.

- I. USFWS and/or NOAA Fisheries Listed Species Clearance Letter or Biological Opinion.
- J. SHPO Cultural Resource Clearance Letter.

V. Mitigation Work Plan

- A. Maps marking boundaries of proposed mitigation types; include DGPS coordinates.
- B. Timing of mitigation: before, concurrent 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.
- C. Grading plan
 - 1. Indicate existing and proposed elevations and slopes.
 - 2. Describe plans for establishing appropriate microtopography. Reference wetland(s) can provide design templates.
- D. Description of construction methods (*e.g.*, equipment to be used)
- E. Construction schedule (expected start and end dates of each construction phase, expected date for as-built plan).
- F. Planned hydrology
 - 1. Source of water.
 - 2. Connection(s) to existing waters.
 - 3. Hydroperiod (seasonal depth, duration, and timing of inundation and saturation), percent open water, water velocity.
 - 4. Potential interaction with groundwater.
 - 5. Existing monitoring data, if applicable; indicate location of monitoring wells and stream gauges on site map.
 - 6. Stream or other open water geomorphic features (*e.g.*, riffles, pools, bends, deflectors).
 - 7. Structures requiring maintenance (show on map). Explain structure maintenance in section 6(c).
- G. Planned vegetation
 - 1. Native plant species composition (*e.g.*, list of acceptable native hydrophytic vegetation).
 - 2. 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. Plant zonation/location map (refer to grading plan to ensure plants will have an acceptable hydrological environment).

4. Plant spatial structure – quantities/densities, % cover, community structure (*e.g.*, canopy stratification).
 5. Expected natural regeneration from existing seed bank, plantings, and natural recruitment.
- H. Planned soils
1. Soil profile
 2. Source of soils (*e.g.*, existing soil, imported impact site hydric soil), target soil characteristics (organic content, structure, texture, permeability), soil amendments (*e.g.*, organic material or topsoil).
 3. Erosion and soil compaction control measures.
- I. Planned habitat features (identify large woody debris, rock mounds, *etc.* on map).
- J. Planned buffer (identify on map).
1. Evaluation of the buffer's expected contribution to aquatic resource functions.
 2. Physical characteristics (location, dimensions, native plant composition, spatial and vertical structure).
- K. Other planned features, such as interpretive signs, trails, fence(s), *etc.*

VI. Performance Standards

- A. Identify clear, precise, quantifiable parameters that can be used to evaluate the status of desired functions. These may include hydrological, vegetative, faunal and soil measures. (*e.g.*, plant richness, percent exotic/invasive species, water inundation/saturation levels). Describe how performance standards will be used to verify that objectives identified in 3(b) and 3(c) have been attained.
- 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).

VII. Site Protection and Maintenance

- A. Long-term legal protection instrument (*e.g.*, conservation easement, deed restriction, transfer of title).
- B. Party(ies) responsible and their role (*e.g.*, site owner, easement owner, maintenance implementation). If more than one party, identify primary party.
- C. Maintenance plan and schedule (*e.g.*, measures to control predation/grazing of mitigation plantings, temporary irrigation for plant establishment, replacement planting, structure maintenance/repair, *etc.*).
 1. Invasive species control plan (plant and animal).

VIII. Monitoring Plan

- A. Party(ies) responsible for monitoring. If more than one, identify primary party.
- B. Data to be collected and reported, how often and for what duration (identify proposed monitoring stations, including transect locations on map).
- C. Assessment tools and/or methods to be used for data collection monitoring the progress towards attainment of performance standard targets.
- D. Format for reporting monitoring data and assessing mitigation status.
 - 1. Monitoring schedule.

IX. Adaptive Management Plan

- A. Party(ies) responsible for adaptive management.
- B. Identification of potential challenges (*e.g.*, flooding, drought, invasive species, seriously degraded site, extensively developed landscape) that pose a risk to project success. Discuss how the design accommodates these challenges.
- C. Discussion of potential remedial measures in the event mitigation does not meet performance standards in a timely manner.
- D. Description of procedures to allow for modifications of performance standards if mitigation projects are meeting mitigation goals, but in unanticipated ways.

X. Financial Assurances

- A. For each of the following, identify 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. Types of assurances (*e.g.*, performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, *etc.*).
- C. Schedule by which financial assurance will be reviewed and adjusted to reflect current economic factors.

APPENDIX E

NATURAL RESOURCES CONSERVATION SERVICE (NRCS) PROGRAM REQUIREMENTS⁵

- NRCS conservation practice standards and specifications
- NRCS Environmental Evaluation
- Mitigation agreement
- Federal/State/Local required permits
- 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

⁵ 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.