

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

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I. Introduction

This document is intended as guidance for Department of the Army (DA) permit applicants under the United States Army Corps of Engineers (Corps of Engineers) Regulatory Program in Detroit District. Compensatory mitigation involves the replacement of aquatic resource functions, values, and services that would be lost as a result of an activity permitted by the Corps of Engineers. Compensatory mitigation is required to offset impacts that cannot be avoided and minimized to the extent practicable. In this document, we have provided background information to assist in the preparation of permittee-responsible compensatory mitigation plans.

The Corps of Engineers regulations regarding compensatory mitigation are available at 33 Code of Federal Regulations (CFR) Parts 325 and 332 in the Federal Register, Vo 73, No. 70

http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/mitig_info.aspx.

The Corps of Engineers Detroit Regulatory Office (Detroit District) evaluates DA permit applications in Michigan and in much of northern Indiana. Applicants who are contemplating a permit application that may require mitigation in Michigan should 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 Action, 1994 PA 451, as amended Information on the State of Michigan program located at <http://www.michigan.gov/deg> (Water, then Wetlands Protection, and then Wetland Mitigation). In Indiana, contact the Indiana Department of Environmental Management (IDEM) Water Quality Section 401 WQC Program at (317) 233-8488 or at <http://www.in.gov/idem/wetlands/2347.htm>. 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 greater than 1:1, on a unit area basis, see Section III, E., Type and Amount of Mitigation. The mitigation ratio will be based on the functions, values, and services of the impacted aquatic resource, the uncertainty of success, the distance and type of wetland proposed for mitigation, 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 mitigation is not successful. The Detroit District will not release the applicant from the permit obligations until the mitigation project attains the goals stated in the approved mitigation plan.

The submission of the final mitigation and monitoring plan should be in a single stand-alone 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 Section IV, Mitigation Planning and Documentation.

In October 2008, the Corps released Regulatory Guidance Letter (RGL) No. 08-03, "Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources." This RGL can be accessed at http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rql08_03.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. Purpose and General Considerations

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, values, and services of aquatic sites, whether the impacted sites are wetlands, streams, or open bodies of water. Not to be overlooked, however, is that sites selected for mitigation currently provide functions that may be lost in the mitigation conservation effort. All mitigation plans should clearly define the net exchange of those aquatic functions, values, and services that would be lost at the impact site and at the mitigation site, and what functions, values, and services would be gained through implementation of the mitigation plan. This comparison should include ecological significance, refuges, buffers, green space, habitat for fish and wildlife, especially listed species, or species with acknowledged state or regional special concerns. The narrative should also discuss how the aquatic functions to be gained would help meet local and regional watershed or waterway management goals. Analysis of this exchange should utilize the same evaluation techniques for both the impact and proposed mitigation site. If there is a time lag between the impact and the construction of compensatory mitigation, these temporal losses of aquatic functions should also be included, as well as justification for this time lag.

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.

Submittal of Mitigation Plans

Regional General Permits (RGP), Nationwide Permits (NWP): When an applicant prepares a request for a verification of a RGP or NWP, which could require compensatory mitigation, a detailed mitigation, management, and monitoring plan shall be submitted with the request to ensure an expeditious review. Any mitigation plan submitted should contain enough detail to enable adequate review and evaluation, but be considered preliminary pending receipt of comments.

If compensatory mitigation is required, the Detroit District may approve a conceptual or detailed compensatory mitigation plan to meet required time frames for general permit verifications, but a final mitigation plan incorporating all required elements, at a level of detail commensurate with the scale and scope of the impacts, shall be approved by the Detroit District before the permittee commences work in water of the United States.

Individual Permits: For an individual permit, the application should include a preliminary mitigation plan. The final mitigation plan, as well as the management and monitoring plan, should be completed following the public review period and Detroit District review of the preliminary plan.

Any mitigation plan submitted should contain enough detail to enable adequate review and evaluation, but be considered preliminary pending receipt of comments. The permittee shall clearly identify any information being claimed as confidential in the mitigation proposal when submitted. In such cases, the Corps' Public Notice shall still provide enough information to enable the public to provide meaningful comments on the proposed mitigation. The applicant(s) should anticipate that mitigation plans may need to be revised based upon comments received during the Public Notice period or during the Notification period.

After addressing any comments provided by the Detroit District, the permittee shall prepare a final mitigation plan. A mitigation plan must be finalized prior to issuing the individual permit. The approved final mitigation plan shall be incorporated into the individual permit by reference. The final mitigation plan shall include all required items, but the level of detail of the mitigation plan should commensurate with the scale and scope of the impacts.

General Guidance for Type of Aquatic Resource Impacts

Streams: Increasingly, the Detroit District is requiring replacement of stream habitat functions, values and services 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," which is

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/4892.htm>) 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. For Stream Assessment information, please see Appendix C.

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.

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, values, and services. 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 establishment 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 establishment. 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 establishment and generally requires a lower replacement 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 establishment 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.

III. General Compensatory Mitigation Requirements

A. General Considerations

Using review procedures prescribed by regulation, the Detroit District will conduct project evaluations and will determine the level of mitigation required, and whether a project is eligible to use permittee responsible compensatory mitigation. The following general guidelines will be used in determining whether use of permittee responsible mitigation is appropriate:

1. All appropriate and practicable steps to avoid and minimize adverse impacts to aquatic resources, as determined by the Detroit District, shall be reflected in an applicant's project plan before authorization to use any type of compensatory mitigation will be granted.
2. Permittee responsible compensatory mitigation should utilize a watershed approach and fully consider the ecological needs of the watershed. Where an appropriate watershed or sub-watershed plan is available, mitigation site selection should be based on recommendations in the plan. The applicant shall describe in detail how the site was chosen and will be developed, including mitigation based on the specific resource need of the impacted watershed.
3. A good mitigation design selects an appropriate site and takes into consideration factors that affect self-sustaining ecological systems, including functions of both wetlands and associated uplands. If the whole landscape design is not integrated with site water management, mitigation efforts may not achieve the performance standards.
4. Mitigation relying on groundwater is more likely to be successful in supporting diverse native communities. Sites with inputs from stream flows are more likely to be successful than those relying solely on precipitation. In all cases, the Detroit District will consider the information supplied by the applicant in determining the acceptability of a project and its proposed mitigation.

B. Type and Location of Compensatory Mitigation

The applicant shall provide a description of the resource type(s) and amount(s) that will be provided, the method of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed, ecoregion, physiographic province, or other geographic area of interest. Compensatory mitigation projects may be sited on public or private lands.

Compensatory mitigation can include wetlands that are restored (re-established or rehabilitated), created (established), enhanced, or preserved. Re-establishment should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation. Full credit will be given for re-establishment of former wetlands and may be given for wetland establishment (creation) from upland. Partial credit can be given for permanent enhancement or rehabilitation of degraded wetlands or in exceptional circumstances,

preservation of existing wetlands. The appropriateness of enhancement, rehabilitation, and preservation, and the corresponding credit ratio will be determined by the Detroit District.

Certain types of enhancement or rehabilitation of existing wetland can be acceptable mitigation if the enhancement or rehabilitation actions are scientifically sound and result in a substantial, measurable, and permanent increase in the level of wetland function. The mitigation plan shall specifically state which aspects of wetland function would be increased as a result of the enhancement or rehabilitation actions, the level to which they would be increased, and the scientific basis for expecting the increase. It shall also include a narrative description of how the enhancement would be accomplished, a schedule of completion, explicit performance standards, and performance milestones for enhancement actions to be carried out over a defined period of time.

When selecting a site, it is important to consider challenges to successfully achieving a net increase in wetland acreage and functions. Examples include:

1. Are hydric soils present on the site?
2. Can wetland hydrology be restored to sites that have been significantly modified through tile drainage or ditch drainage?
3. Can native plant communities be introduced in sites where the original plant seed bank is lacking?
4. Is the site dominated by aggressive and/or exotic species such as reed canary grass, cattails, purple loosestrife or other species?
5. Is it practicable to remove exotic or aggressive species, and introduce a diverse assemblage of native species appropriate for the site?

C. Watershed Approach

In cases where the Detroit District determines that an appropriate watershed plan is available, the watershed approach to mitigation site selection should be based on that plan. Where no such plan is available, the watershed approach should be based on information provided by the project sponsor or available from other sources. The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites.

A watershed approach to compensatory mitigation considers how the types and locations of compensatory mitigation projects will provide the desired aquatic resource functions, and will continue to function over time in a changing landscape. It also considers the habitat requirements of important

species, habitat loss or conversion trends, sources of watershed impairment, and current development trends, as well as the requirements of other regulatory and non-regulatory programs that affect the watershed, such as storm water management or habitat conservation programs. It includes the protection and maintenance of terrestrial resources, such as non-wetland riparian areas and uplands, when those resources contribute to or improve the overall ecological functioning of aquatic resources in the watershed. Compensatory mitigation requirements determined through the watershed approach should not focus exclusively on specific functions (e.g., water quality or habitat for certain species), but should provide, where practicable, the suite of functions provided by the affected aquatic resource.

D. Site Selection

Available data should clearly justify the selected mitigation site. Briefly describe similarities between the proposed wetland mitigation site 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.

The most important design factor for mitigation is attaining and maintaining appropriate hydrological conditions. Applicants should be aware that re-establishment of former wetlands is much more likely to succeed than wetland establishment. 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.

E. Mitigation Type, Amount and Other Considerations

1. Type and Amount

The Detroit District will typically require a minimum of 1.5 acres for every 1.0-acre of impacted waters of the U.S., including wetlands. Higher mitigation ratios are typically required for habitat types including forested and scrub/shrub wetlands that take many years to exhibit success. Higher mitigation ratios for after-the-fact authorizations, enhancement and preservation of existing wetlands and impacts to higher quality wetlands may be required. If the functions, values, and services of the aquatic resource to be impacted are high, but after review, the Detroit District determines the project is in compliance with the Section 404(b)(1) Guidelines, and is found not to be contrary to the public interest, this minimum ratio may be substantially increased and justification for the decision will be provided. The mitigation ratio also accounts for temporal loss of the aquatic resources.

The Detroit District will give consideration to the preservation of existing high quality wetlands as mitigation for the loss of lower quality wetlands under certain circumstances. Preservation alone will be considered only upon a clear demonstration by the applicant that the preserved wetlands and/or uplands are regionally important and are under demonstrable threat of loss or substantial degradation from human activities that might not otherwise be avoided. Applicants shall also demonstrate that the existing wetlands/uplands are likely to remain of high quality (e.g., a land stewardship organization has agreed to accept responsibility, funding for management is provided, etc.). When preservation is used in conjunction with restoration, establishment, or enhancement of additional wetlands, credit will be considered only when the preserved resource will augment the functions of newly established, restored, or enhanced aquatic resources. Unregulated, high quality isolated wetlands that are under demonstrable threat may be suitable candidates for preservation credit as mitigation for loss of lower quality jurisdictional wetlands.

Preservation may be used to provide compensatory mitigation for activities authorized by DA permits when all the following criteria are met:

- a. The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
- b. The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the Detroit District shall use appropriate quantitative assessment tools, where available;
- c. Preservation is determined by the Detroit District to be appropriate and practicable;

- d. The resources are under threat of destruction or adverse modifications; and
- e. The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

Where preservation is used to provide compensatory mitigation, to the extent appropriate and practicable the preservation shall be done in conjunction with aquatic resource restoration, establishment, and/or enhancement activities. This requirement may be waived by the Detroit District where preservation has been identified as a high priority using a watershed approach, but compensation ratios shall be higher. The Detroit District generally requires at least a 10:1 compensation ratio, or ten acres of preserved habitat per acre of permitted aquatic resource impact.

2. Buffers

The Detroit District may require the restoration, establishment, enhancement, and preservation, as well as the maintenance of riparian areas and/or buffers around aquatic resources where necessary to ensure the long-term viability of those resources. Buffers may also provide habitat or corridors necessary for the ecological functioning of aquatic resources. If buffers are required by the Detroit District as part of the compensatory mitigation project, compensatory mitigation credit may be provided for those buffers. Credit for buffers is generally applied at a lower ratio than for wetlands.

Minimum buffer widths are 50 feet wide for sites with threats from adjoining land uses.

3. Use with other permit programs

Compensatory mitigation for DA permit may also be used to satisfy other programs such as state, tribal or local wetland regulatory programs, Corps Civil Works programs and others. However, the same credits cannot be used to satisfy more than one permitted activity. Also federally funded conservation and restoration projects such as the Wetlands Reserve Program cannot be used to generate credits for activities authorized by a DA permit. For credit under a DA permit, activities may be done in conjunction with, but supplemental to, such federally funded projects. Please see 332.3(j) at pages 19675-6 of the Compensatory Mitigation Rule in the Federal Register announcement.

4. Permit Conditions

The compensatory mitigation required for a DA permit must be clearly stated as a special condition of the permit. The special conditions must also name the party or parties responsible for the implementation, performance, and long-term management of the compensatory mitigation

project. The Detroit District typically meets this requirement by incorporating the completed mitigation plan into the DA permit special conditions.

5. Timing, Temporal Loss

The Detroit District encourages initiation of the mitigation work plan at the earliest time practicable, and not later than concurrently with the start of work on activities authorized in the DA permit. In some circumstances, the Detroit District will require additional compensatory mitigation credits if delays will cause temporal losses of aquatic functions.

6. Financial Assurances

The Detroit District will consider the need for financial assurances based on size and complexity of compensatory mitigation project and will require them if there is a need to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards. These assurances will then become part of the completed mitigation plan. The Detroit District prefers the use of performance bonds to assure successful completion of site construction, planting, and site monitoring and maintenance. Other forms of financial assurance can be used but will be reviewed by the District on a case-by case basis prior to approval.

Provisions for funding the long-term site management plan is not considered a financial assurance, but will be required in a complete mitigation plan.

IV. Mitigation Planning and Documentation

A. Objectives

Describe the resource type(s) and amount(s) that will be provided, the method of compensation, how the mitigation project will replace lost functions at the impact site, and how the anticipated functions of the mitigation project will address watershed needs.

B. Site Selection

The Detroit District requires the following documentation for the mitigation site selection process:

1. Physical attributes of sites

- a. Describe location and existing unaltered conditions, including rationale for choice. Include details on how the site meets the goals, objectives, the general need for and the technical feasibility of the proposed mitigation. Also include a discussion of the ecological suitability of the proposed site, and how that site will support the planned types of aquatic resources and functions, including the assurance of sufficient

hydrology to support the long-term sustainability of the mitigation. Indicate distance from project if offsite.

2. Hydrological Regime

- a. Indicate source(s) of water;
- b. Depict discharge points;
- c. Note sites affected by seasonal flooding;
- d. Depict direction(s) of flow;
- e. Indicate size of watershed (provide map); and
- f. Provide seasonal hydrograph.

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

3. Provide the following documentation:

- a. Copy of U.S.G.S. quad map with proposed mitigation location outlined and clearly identified in black and white;
- b. Site location map showing established roads;
- c. Base topographic map with proposed mitigation site(s) outlined and acreage indicated and fixed reference points;
- d. Development plan (where site is located within the development, indicating lots, lot numbers, roads, etc.);
- e. Construction documents (grading, planting plan, etc.);
- f. Soil survey and National Wetlands Inventory (NWI) maps; and
- g. Identification of existing wetlands and other waters of the U.S.
 - i. Submit a scale map of the proposed mitigation site showing all wetlands and other waters of the U.S.
 - ii. All wetlands on the proposed mitigation site must be delineated using forms from the appropriate Regional Supplement to the 1987 Corps of Engineers Wetlands Delineation Manual. Data forms and site plans must accompany the completed delineation report.
- h. Give all present and proposed zoning designations for the proposed mitigation site and adjoining properties.

4. 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.

C. Site Protection Instrument

Provide a description of the legal arrangements and instrument, including site ownership that will be used to ensure the long-term protection of the compensatory mitigation project site. The Detroit District has a strong preference for the use of Conservation Easements. In Michigan, Conservation Easements required by the Michigan Department of

Environmental Protection (MDEQ) are often acceptable for use in the mitigation plan for the respective DA permit.

D. Baseline Information

Provide a description of the historic and existing characteristics of the proposed mitigation site including existing and proposed hydrologic, soil, and vegetation conditions, including any invasive species. Provide a comparison of the impact site and the mitigation site. A delineation of aquatic sites at both the impact and mitigation site is required.

E. Determination of Credits – ratios, functional measures

Provide a description of the number and type of credits to be provided including a brief rationale explaining how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the proposed activity.

F. Mitigation Work Plan

1. Timing of Mitigation

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.

2. Site Preparation

Provide detailed plans for the following:

a. Grading

- i. Indicate existing and proposed elevations. Provide base topographic maps showing planned site preparation. All maps and plans submitted shall be legible, include a graphical scale, a north arrow, and an elevation datum.
- 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.

b. 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) and 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.

c. *Hydrological Regime*

- 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. Seasonal 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 justification for the use of any water control structures. Indicate location and provide details of water control structures and explain their maintenance in the “Site Protection and Maintenance” section.
- xii. Provide hydrological table 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.

d. *Vegetation*

The planting plan and methods must be described in the proposed mitigation plan. The following information must be incorporated into the planting plan:

- i. Provide a table of species to be planted, including numbers, spacing, types of propagules, plant age(s)/pot sizes, etc. Scientific and common names must be used, as well as the appropriate indicator status for each species. Use the interagency National Wetland Plant List maintained by the Corps of Engineers at <http://rsgisias.crrel.usace.army.mil/NWPL/>.
 - ii. To support the success of a mitigation plan, it is necessary to identify the locale from which the materials are collected. 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;
 - iii. Show planting locations on a base topographic map according to species. The map must include elevations and proposed water levels. Demonstrate that the appropriate plant species are growing in suitable areas;
 - iv. Describe all the target vegetative communities 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, marsh, sedge meadow, wet prairie, etc.) Map the location(s) of the different communities and provide an estimated acreage of each community to be created/restored.
 - v. Indicate plant spatial structure-quantities/densities, percent cover, community structure (e.g., canopy stratification);
 - vi. 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
 - vii. 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.
- e. *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.

f. *Other*

- i. Planned habitat features. Identify 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.

3. 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 constitute the first monitoring year of the monitoring plan. **Year one of mitigation monitoring begins once a full growing season has elapsed since the completion of the initial planting plan.**

4. As-Built Conditions

The plan must specify that the applicant will:

- a. Submit a report, including complete construction documents, to the Detroit District 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,* and
- b. Provide topographic maps showing as-built contours of the mitigation site. Indicate location of plantings and any other installations or structures.

G. Maintenance Plan

Provide a description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

1. Responsible Parties

- a. 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.
 - b. 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.
 - c. 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 Detroit District for review.
- 2. Maintenance Plan and Schedule**
Describe all planned maintenance activities and provide a schedule. The plan should include but is not limited to:
- a. irrigation methods (NOTE: Detroit District limits use of irrigation to two years as noted in the Mitigation Work Plan.);
 - b. plant replacement;
 - c. weeding;
 - d. invasive species identification and eradication;
 - e. water structure inspection;
 - f. fertilization;
 - g. erosion control;
 - h. herbivore protection;
 - i. controlled burns; and/or
 - j. other maintenance activities.

H. Performance Standards

Performance standards will be used to determine whether the mitigation project is meeting its objectives. The Detroit District requires interim

performance standards to assist in review of the project in its early stages. Final performance standards approved by the Detroit District will be used to determine whether the project has met its objectives and can be considered successful.

Interim performance standards: Provide expected targets for hydrology, vegetation and hydric soil development and/or other measures as appropriate for each year that monitoring is proposed. Commonly used interim standards include successful establishment of cover crops, the percent cover by hydrophytic vegetation, measures of hydrologic conditions including water depth, duration of flooding, ponding, height of water table, and soil saturation. Targets should be set that are consistent with each type of aquatic resource proposed to be provided in the mitigation project.

Final performance standards: Provide standards which can be used to measure whether the proposed types and amounts of aquatic resources have been or are likely to be provided by the mitigation. Fulfillment of these criteria should indicate that the mitigation site has met or is progressing towards the habitat type, functions, values, and services that constitute the long-term goals of this mitigation. [RGL 08-03](#) provides broad guidance on mitigation performance standards.

Minimum Final Performance Standards / Success Criteria

1. Vegetation

a. Percent vegetation cover and/or density.

1. 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. For forested wetland areas, the site must support a minimum of 300 surviving, established, free to grow trees (minimum, 2 meters tall) per acre that are classified as native wetland species (classified as FAC, or more strongly hydrophytic, i.e. FACW or OBL) on the National Wetland Plant List, NWPL) and consist of at least three different tree species.
3. For scrub/shrub wetland areas, the site must support a minimum of 300 individual surviving, established, and free to grow shrubs per acre that are classified as native wetland species (FAC, FACW, or OBL on NWPL) and consist of at least three different shrub species.

2. Plant Community Metrics

- a. The diversity of the plant community within the mitigation site must be measured. 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.

- b. 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.
 - c. 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 plant communities and/or habitat types including comparison of the targeted acreage of the communities and/or habitats must be provided. 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.
 4. Exotic and Undesirable species
 Certain exotic and/or undesirable species are known to develop into large monotypic stands and must not be present in the mitigation site in large clumps. Also, they should be excluded from any plantings and seeds mixes. Examples of such species include, but are not limited to:

<i>Alliaria petiolata</i>	Garlic Mustard
<i>Lythrum salicaria</i>	Purple Loosestrife

<i>Myriophyllum spicatum</i>	Eurasian Water Milfoil
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phragmites australis</i>	Common Reed
<i>Frangula alnus</i>	Glossy False Buckthorn

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.

5. Soil supports targeted vegetation, and shows signs of hydric characteristics; or the site shows evidence of sufficient hydrology that hydric soil indicators are expected to develop.
6. Hydrology
 - a. 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 the applicable Regional Supplement(s)). We will require direct evidence that the mitigation site is demonstrating wetland hydrology. Specifically, we will require evidence that wetland hydrology indicators A1 - surface water, A2 - high water table, or A3 saturation as described in the Regional Supplements have been met.
 - b. Appropriate hydrology for the target habitats or communities 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. *NOTE: it is possible to fully meet the general wetland hydrology condition while failing to meet target habitat type - failure to meet any conditions will require the undertaking of corrective measures.*
7. Wetland delineation. A wetland delineation, including a certified land survey of the boundary, must be submitted for Detroit District approval, and verified by the Detroit District 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; and with reference to the appropriate Regional Supplements).

I. Monitoring Requirements

The monitoring plan is used to determine the responsibilities of the permittee. Monitoring is a basic requirement for all mitigation plans accepted by the Detroit District. 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.

The duration of monitoring will be determined by the Detroit District. The type of ecosystems or habitats created or restored by mitigation will dictate the length of the monitoring period. Emergent or aquatic systems will generally require monitoring for five years. Ecosystems or habitats that include a scrub-shrub component require monitoring of no less than five years. Mitigation sites that encompass a forested component require ten years of monitoring, with field visits in seven of those years; during years one through four, six, eight and ten. The entire mitigation site must be monitored at each field visit. In certain circumstances, the Detroit District can consider waiving part of the monitoring period. The Detroit District may also extend the monitoring period to assure the site has met performance standards.

1. **Responsible Parties.** Identify party(ies) responsible for completing the monitoring. If more than one, identify primary party.
2. **Required Monitoring Methods**
 - a. Description of proposed monitoring methods must be provided. Include monitoring schedule, sample sizes, justification for sampling schemes, and data analyses to be performed.
 - b. 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 site(s).
 - c. 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.
 - d. Vegetation monitoring must begin at the established sampling points no sooner than one year after the initial planting. At least one inspection must occur (during the growing season) per monitoring year for the life of the required monitoring period to document hydrology, vegetation and soils. Only one report per monitoring year is required regardless of the number of inspections.
 - e. 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 and “non-targeted” vegetative communities/habitats must be provided and the location of these communities must be indicated on a map of the mitigation site.

- f. Photographs may be taken during each monitoring period from the same vantage point and in the same direction every year. RGL 08-03 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 08-03, photographs are to be submitted as part of the 4-page maximum Summary Data portion of the monitoring report.
- g. In order to ensure comparable assessments, continuity of monitoring methodology must be maintained.

3. **Optional Monitoring Methods**

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

- a. Growth rates for herbaceous vegetation, trees and/or shrubs;
- b. Wildlife surveys;
- c. Amphibian surveys;
- d. Macroinvertebrate sampling; and
- e. Water quality.

4. **Annual Reports**

- a. Monitoring reports shall assess both the attainment of yearly target criteria and progress toward final success criteria. Reports must be submitted to the Detroit District no later than December 31. For annual reports received by the Detroit District 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.
- b. Recognizing that the summer is a busy time, the Detroit District 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.
- c. RGL 08-03’s format for submitting reports is provided below:
 - i. Project Overview (1 page)***
 - a. Detroit District Permit Number
 - b. Name of party responsible for conducting the monitoring and the date(s) the inspection was conducted.

- c. 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.
- d. 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.).
- e. Dates the compensatory mitigation project commenced and/or was completed.
- f. Short statement on whether the performance standards are being met.
- g. Dates of any recent corrective or maintenance activities conducted since the previous report submission.
- h. 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, 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 (e.g., tables, charts, etc.) should be provided to validate 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 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 ½" 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. Conclusion (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 Detroit District will ultimately determine if the mitigation site is successful for a given monitoring project.

5. General

Any vegetation data submitted will include scientific name, common name and wetland indicator status. (See National Wetland Plant List <http://rsgisias.crrel.usace.army.mil/NWPL/>.)

J. Long-Term 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). A method of funding the required long term maintenance is required. The Detroit District prefers a non-wasting fund payable to the long term manager, such as an endowment or trust set up specifically for use at the mitigation site.
2. All mitigation required by Detroit District permits is permanent unless otherwise noted in the permit document. The Detroit District may take enforcement action even after the identified monitoring period has ended.

K. Adaptive Management Plan

An adaptive management plan must be included in the mitigation plan, identifying the party(ies) and responsibilities of all parties. A signed management agreement must include a strategy to address unforeseen changes in site conditions or other factors that may affect success of the mitigation project in accordance with its performance standards. Additional requirements include:

1. The property owner must be clearly identified as one of the responsible parties.
2. This agreement must be in writing and submitted to the Detroit District for review.

3. Identification of Potential Challenges
 - a. 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.
 - b. 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?
 - ii. Indicate what entity, if any, controls water flow and the associated water control structure(s) onto, or off of, the mitigation site. Arrangements must be made by the applicant that guarantees a sufficient water supply to sustain the mitigation wetland based upon the permitted design specification.
 - c. 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.
 - d. The following hydrophytic species must be excluded from the mitigated wetland during the management phase:

<i>Alliaria petiolata</i>	Garlic Mustard
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Myriophyllum spicatum</i>	Eurasian Water Milfoil
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phragmites australis</i>	Common Reed
<i>Fragula alnus</i>	Glossy False Buckthorn

4. 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.

L. Financial Assurances

1. *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.

2. *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. The Detroit District strongly prefers use of a performance bond as described in [RGL 05-01](#). Use of other types of assurances will be reviewed by the Detroit District on a case-by-case basis. 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.
3. *Schedule.* Financial assurance will be reviewed and adjusted to reflect current economic factors.

M. Other Information as Required

The District Engineer may require additional information to determine the appropriateness, feasibility, and practicability of the compensatory mitigation project. The applicant should perform title research on proposed mitigation sites and consider what liens, easements or other encumbrances may exist. The applicant should provide a list of these encumbrances to the Detroit District with a discussion of how any future maintenance may affect the mitigation site. Applicants should be aware of and consider any threats of changes in hydrological conditions due to changes in drainage arrangements, or maintenance of existing drains that could alter mitigation site hydrology.

Appendix A: Definitions

III. Definitions – See in the Federal Mitigation Rule: 33 CFR 332.2. Fed Register pages 19671 – 19672.

Adaptive Management: The development of a management strategy that anticipates likely challenges associated with compensatory mitigation projects and provides for the implementation of actions to address those challenges, as well as unforeseen changes to those projects. It requires consideration of the risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides modification of those projects to optimize performance. It includes the selection of appropriate measures that will ensure that the aquatic resource functions are provided and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems.

Buffer: An upland, wetland and/or riparian area that protects and/or enhances aquatic resource functions associated with wetland, rivers, streams, lakes from disturbances associated with adjacent land uses.

Detroit District: The U.S. Army Corps of Engineers, Detroit District

Compensatory Mitigation: Replacement of aquatic resources and its functions, values, and services, for the purposes of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. The replacement of the wetland functions, values, and services is generally accomplished through wetland restoration (re-establishment or rehabilitation), establishment, enhancement, or in exceptional circumstances, wetland preservation.

Department of the Army Permits or DA Permits: Authorizations for certain work and structures in navigable waters and for the discharge of dredged or fill material into waters of the United States, including wetlands, issued by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act and/or Sections 9 or 10 of the Rivers and Harbors Act of 1899.

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

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

in aquatic resource area. Because impacts associated with individual projects that propose mitigation will, in virtually all cases, be permanent, only enhancement that results in permanent improvement of functions, values, and services of aquatic resources will be acceptable. .

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

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 in a region.

Free to Grow: Tree or shrub sufficiently vigorous to need little further maintenance or monitoring. Trees would generally be a minimum of 2 meters tall with intact, healthy upper branches. Shrubs would generally be a minimum of 1 meter tall with intact, healthy upper branches.

Functions: The physical, chemical, and biological processes that occur in ecosystems.

Growing Season: The period of the year when plants are actively growing. Methods of determining the beginning and ending dates include field observation of plant growth and senescence, field measurement of soil temperature, and estimation from median dates of 28 degree air temperature as described in the Regional Supplements to the Corps of Engineers Wetland Delineation Manual (Northcentral and Northeast Regional Supplement, pp. 78-81 and Midwest Regional Supplement, pp.70-72).

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. (Northcentral and Northeast Regional Supplement pp. 32, 36 and Midwest Regional Supplement, p. 32)

Hydrophytic Vegetation: The community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence. Hydrophytic vegetation is present when the plant community is dominated by species that require or can tolerate prolonged inundation or soil saturation during the growing season. (Northcentral and Northeast Regional Supplement, p.15 and Midwest Regional Supplement, p.15)

In-kind Mitigation: A resource of a similar structural and functional type to the impacted resource.

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 (*Typha 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.

Management: Actions taken within a mitigation site to establish and maintain desired habitat conditions. Representative management actions include, but are not limited to, water level manipulations, herbicide use, mechanical plant removal, and prescribed burning.

Mitigation: A process including avoiding, minimizing, rectifying, reducing, or compensating for losses of aquatic resource functions, values, and services.

Monitoring: A specific program of data collection which documents the physical, chemical, and biological characteristics of the Mitigation site, for the purpose of determining compliance with performance standards established.

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

Non-native: Also referred to as alien, exotic or invasive species. 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.

Off-site Mitigation: An area that is neither located on the same parcel of land as the impact site, nor on a parcel of land contiguous to the parcel containing the impact site.

On-site Mitigation: An area located on the same parcel of land as the impact site, or on a parcel of land contiguous to the impact site.

Out-of-kind Mitigation: A resource of a different structural and functional type from the impacted resource.

Performance Standards: Observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives.

Permittee-Responsible Mitigation: An aquatic resource restoration, establishment, enhancement, and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.

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

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

1. Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.
2. Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Services: The benefits that human populations receive from functions that occur in ecosystems.

Standard Permit: A standard, individual permit issued under the authority of section 404 of the Clean Water Act and/or sections 9 or 10 of the Rivers

and Harbors Act of 1899.

Site Development Plan (Mitigation Plan): A plan for the proposed mitigation site that identifies all actions that will be undertaken to generate mitigation. Representative elements of the site development plan include, but are not limited to, plans for site grading, re-vegetation, establishment of hydrology, erosion control, structures, proposed utilities, management, and monitoring.

Temporal Loss: The time lag between the loss of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site. Higher compensation ratios may be required to compensate for temporal loss. When the compensatory mitigation project is initiated prior to, or concurrent with, the permitted impacts, the Detroit District may determine that compensation for temporal loss is not necessary, unless the resource has a long development time.

Waters of the United States: Those areas subject to U.S. Army Corps of Engineers regulatory authority pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, as defined at 33 C.F.R. Part 328.3(a).

Watershed: A land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean.

Watershed Approach: An analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions, values, and services caused by activities authorized by DA permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for DA permits.

Watershed Plan: A plan developed by federal, tribal, state and/or local government agencies or appropriate non-governmental organizations, in consultation with relevant stakeholders, for the specific goal of aquatic resource restoration, establishment, enhancement, or preservation. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans may also

identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and aquatic resource management plans.

Wetlands: Areas that are inundated or saturated by surface water or groundwater 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. Examples of wetland types may be found in Classification of Wetlands and Deepwater Habitats of the United States, (December 1979), published by the United States Fish and Wildlife Service, or in Wetland Plants and Plant Communities of Minnesota and Wisconsin (1987), by Eggers and Reed.

Appendix B: Mitigation Plan Checklist

I. Objectives

- A. Describe resource types and amounts to be provided
- B. Provide method of compensation (restoration, establishment, etc.)
- C. Describe how anticipated functions, values, services will address watershed needs

II. Site Selection

- A. Describe factors considered in selecting mitigation site
- B. Include watershed needs, off-site versus on-site alternatives
- C. Show site is suitable for an ecologically self-sustaining mitigation project
- D. Include current and future land uses and compatibility

III. Site Protection Instrument

- A. Provide legal arrangements and instrument to protect mitigation site
- B. Provide information on site ownership
- C. Provide information on all responsible parties

IV. Baseline Information

- A. Describe both impact site and mitigation site
- B. Include historic and present plant, hydrology, and soil conditions
- C. Provide a delineation of waters of the United States

V. Determination of Credits

- A. Describe how the number of credits to be generated was determined
- B. Describe how the mitigation will provide required compensation for permitted, unavoidable impacts to aquatic resources

VI. Mitigation Work Plan

- A. Location and boundaries of mitigation site
- B. Describe planned hydrology, vegetation, soils, and buffers
- C. Construction Plan; timing, sequence, source of water, grading, erosion control measures
- D. Provide methods to establish planned plant community
- E. Describe methods for invasive plant species control

VII. Maintenance Plan

- A. List parties and responsibilities
- B. Provide maintenance plan and schedule
- C. Describe how planned activities will ensure continued viability of planned aquatic resources

VIII. Performance Standards

- A. Identify interim standards and final success criteria for -
 - > Hydrology appropriate to planned resources
 - > Vegetation appropriate to planned resources
 - > Areal limits for unvegetated areas, and areas with invasive plant species

IX. Monitoring Requirements and Plan

- A. Provide monitoring schedule
- B. Identify all responsible parties; identify their responsibilities
- C. Specify data to be collected, including assessment tools and methodologies
- D. Describe how performance standards are or are not being met
- E. Recommend whether adaptive management is needed

X. Long-Term Management Plan

- A. Describe management after performance standards are achieved
- B. Provide task list, schedule, and annualized costs
- C. Provide long-term financing mechanism
- D. Identify long-term manager and responsible party

XI. Adaptive Management Plan

- A. Identify all responsible parties; identify their responsibilities
- B. Provide remedial measures to address unforeseen changes in site condition

XII. Financial Assurances

- A. Identify all parties responsible for assurances
- B. Specify type of assurance, contents, dollar amounts and schedule
- C. Describe how assurance is sufficient to ensure high confidence that mitigation project will be completed and met its performance standards

Other: Other information may be required to determine the appropriateness or feasibility of a proposed mitigation project. This may include a full disclosure of liens and easements on a property, the condition of nearby similar aquatic resources, future land use trends, and long term access to the source of hydrology.

Appendix C: Resources

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

Michigan's Stream Team, 2010. Protocol for Field Surveys of Stream Morphology in Michigan. www.michigan.gov/documents/deq/mist-protocol_311730_7.doc

State of Ohio Qualitative Habitat Evaluation Index (QHEI):
<http://epa.ohio.gov/portals/35/documents/QHEIManualJune2006.pdf>