

Guidelines for Wetland Mitigation Banking in Ohio

March 2011

SECTION 1: PURPOSE AND GOALS

On April 10, 2008, the U.S. Army Corps of Engineers (the Corps) and the U.S. Environmental Protection Agency published a joint federal rule which established regulations governing compensatory mitigation for activities authorized by Department of the Army (DA) permits issued pursuant to Section 404 of the Clean Water Act and/or Sections 9 and 10 of the Rivers and Harbors Act of 1899. The Ohio Environmental Protection Agency (Ohio EPA) has rules that govern wetland compensatory mitigation for Section 401 Water Quality Certifications which have been in effect since 1998 (Ohio Administrative Code 3745-1-50 to 54). The state legislature developed Ohio's Isolated Wetland Statute in 2001 (Ohio Revised Code 6111.02 to 6111.029), which regulates compensatory mitigation for impacts to isolated wetlands. All these mitigation rules emphasize the need to use a watershed approach when making decisions regarding the best approach for replacing aquatic resource functions lost due to unavoidable impacts permitted through the Section 404/401 and Isolated Wetland permitting programs. The state and federal rules stress the importance of locating mitigation banks on sites that are ecologically appropriate and where aquatic resource restoration will have the highest probability of successfully replacing lost functions and ecological services.

The purpose of this document is to provide those interested in mitigation banking with a statewide guide developed by the Interagency Review Team (IRT) to ensure that wetland mitigation banks established in Ohio will have the greatest likelihood of success. The Ohio IRT is composed of representatives from the Buffalo, Huntington and Pittsburgh Districts of the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency Region V, the U.S. Fish and Wildlife Service, the Natural Resource Conservation Service, the Ohio Environmental Protection Agency, and the Ohio Department of Natural Resources.

The Guidelines for Wetland Mitigation Banking in Ohio (Guidelines) have been developed to ensure that mitigation banks meet the fundamental objective of compensatory mitigation, which is to offset environmental losses resulting from unavoidable impacts to waters of the United States and of the State of Ohio authorized by DA permits and/or Ohio EPA. The Guidelines have been developed to increase the likelihood for ecological success and sustainability of aquatic resources developed by mitigation banks. In order to meet this goal, mitigation bank sites should be located where they are most likely to successfully replace lost functions and services using a watershed approach. This will require consideration of watershed scale features such as aquatic habitat diversity, habitat connectivity, hydrologic connectivity, and compatibility with local land uses. The Guidelines also identify the financial assurances and long-term management requirements, define ecological performance standards and monitoring criteria, and outline a credit release schedule and typical credit ratios for banks operating in Ohio. Applicable portions of the Guidelines may be used in the development of other wetland mitigation.

SECTION 2: DEFINITIONS

Note: Federal rule definitions should be used in all mitigation bank submittals. Where the definitions in Ohio rule differ from federal rule, both definitions are provided in this section. In the remainder of the Guidelines, the federal rule definitions are used.

1. 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. (See Section 7).

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

3. Compensatory Mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Ohio rule definition - “Compensatory mitigation” refers to the final step in the alternatives analysis and means restoration, creation, enhancement or, in exceptional circumstances, preservation of wetlands expressly for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization have been achieved.

4. 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. NOTE: Because impacts associated with individual projects that propose to use bank credits will, in virtually all cases, be permanent, only enhancement that results in permanent improvement of functions and values of aquatic resources will generate credits in Ohio.

Ohio rule definition - “Enhancement” means activities conducted in existing wetlands to improve or repair existing or natural wetland functions and values of that wetland.

5. 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. Ohio Rule Definition - "Creation" means the establishment of a wetland where one did not formerly exist. This would involve wetland construction on non-hydric soils.

6. Ledger: Document to be used in the accounting of credits and debits. A ledger will be maintained by the bank sponsor and audited by the appropriate Corps District on an annual basis.

7. Management: Actions taken within a mitigation bank 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.

8. Mitigation Bank: A site, or suite of sites, where aquatic resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by DA permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.

Ohio rule definition - "Mitigation bank" means a site where wetlands have been restored, created, enhanced or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation generally in advance of authorizing impacts.

9. Mitigation Bank Credits: The unit of measure (e.g., a functional or areal measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site. The measure of aquatic functions is based on the aquatic resources restored, established, enhanced, or preserved. NOTE: For the purposes of this document, the unit of measure for bank credits will be acres.

10. Mitigation Bank Instrument: The legal document for the establishment, operation, and use of a mitigation bank.

11. Mitigation Plan: A detailed plan which describes how the bank will be established and operated. The mitigation plan must include the following 12 items: Objectives of the bank; Site selection; Site protection instrument; Baseline information; Determination of credits; Mitigation work plan; Maintenance plan; Performance standards; Monitoring requirements; Long-term management plan; Adaptive management plan; and Financial assurances. The mitigation plan will be incorporated into the bank instrument. (For a more detailed description of these 12 items see Appendix 1 of this document.)

12. Monitoring: A specific program of data collection which documents the physical, chemical, and biological characteristics of the Mitigation Bank, for the purpose of determining compliance with performance standards established in Section 10 of this document.

13. 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.

Ohio rule definition - “Preservation” means protection of ecologically important wetlands in perpetuity through the implementation of appropriate legal mechanisms to prevent harm to the wetland. Preservation may include protection of adjacent upland areas as necessary to ensure protection of the wetland.

14. Prospectus: A plan for a compensatory mitigation bank prepared by a potential bank sponsor and submitted for consideration to the interagency review team. The prospectus provides full discussion of the proposed mitigation bank and serves as the basis for the public and interagency review comments.

15. 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:

a. 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.

b. 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.

Ohio rule definition - “Restoration” means the re-establishment of a previously existing wetland at a site where it has ceased to exist.

16. Service Area: The geographic area within which impacts can be mitigated at a specific mitigation bank or an in-lieu fee program, as designated in its instrument.

Ohio rule definition - “Mitigation bank service area” means the designated area where a mitigation bank can reasonably be expected to provide appropriate compensation for impacts to wetlands and other aquatic resources.

17. Sponsor: Any public or private entity responsible for establishing, and in most circumstances, operating a compensatory mitigation bank or in-lieu fee program.

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

Ohio rule definition - “Watershed” means a common surface drainage area corresponding to one from the list of thirty-seven adapted from the forty-four cataloging units as depicted on the hydrologic unit map of Ohio, U.S. Geological Survey, 1988, and as described in paragraph (F)(2) of rule 3745-1-54 of the Administrative Code or as otherwise shown on map number 1 found in rule 3745-1-54 of the Administrative Code. Watersheds are limited to those parts of the cataloging units that geographically lie within the borders of the state of Ohio. A map is also available in Appendix 2 of this document.

19. 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 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.

20. 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.

SECTION 3: PROCESS

The mitigation bank review process occurs in three mandatory steps with an optional additional step as described below. The review process, including timeframes, is detailed in 33 CFR 332.8(d) Mitigation Banks and In-Lieu Fee Programs, Review Process. While the Mitigation Rule does not require the Step 1 draft prospectus, it is highly recommended that Step 1 be initiated for mitigation banking proposals in the state of Ohio. A checklist for the items to be included in each of the steps is located in Appendices 3 – 5 of this document. The items required are detailed in 33 CFR 332.8(d); additional items may be provided earlier in the process if the sponsor chooses.

Step 1 (optional but highly recommended): Draft Prospectus - To initiate preliminary coordination, a brief, concept level proposal should be submitted when initially scoping the concept of a bank, contemplating pursuing a bank idea or for those new to the banking process. For the sponsor, the preliminary review process is optional, but strongly recommended; it allows the IRT the opportunity to let the potential sponsor know if the proposed site would be an appropriate candidate for a mitigation bank. The draft prospectus should include, at a minimum, all items listed in Appendix 3 of this document. The sponsor may elect to give a presentation on the proposed site to the IRT prior to submitting a draft prospectus. After review of the draft prospectus by the IRT,

comments will be provided to the sponsor and a site visit may be scheduled if the IRT considers the proposed site has mitigation banking potential.

Step 2: Prospectus - To initiate the formal review process, a complete prospectus must be submitted by the sponsor. A Public Notice advertising the mitigation bank prospectus will then be issued by the Corps. Therefore, figures provided in the prospectus must be legible, in black and white, and submitted on 8.5 x 11-inch paper. The prospectus must provide a summary of the information regarding the proposed mitigation bank at a sufficient level of detail to support informed public and IRT comment. The information required to be included in the prospectus is detailed in 33 CFR 332.8(d)(2) Mitigation Banks and In-Lieu Fee Programs, Review Process - Prospectus (see checklist in Appendix 4 of this document). To expedite the review process, the IRT highly recommends the potential sponsor also include a delineation of all aquatic resources on the proposed site. An electronic version of the prospectus shall be provided to the Corps on a compact disc (CD). At the end of the comment period, the Corps will provide to the sponsor a written initial evaluation as to the potential of the proposed mitigation bank to provide successful compensatory mitigation. If the Corps determines that the proposed mitigation bank has potential for providing appropriate compensatory mitigation, the Corps will inform the sponsor that he/she may proceed with preparation of a draft bank instrument.

Step 3: Draft Bank Instrument – After considering comments from the Corps, the IRT, and the public, if the sponsor chooses to proceed with the establishment of the mitigation bank, the sponsor must submit a complete draft instrument to the Corps. The draft instrument must be based on the prospectus and must describe in detail the physical and legal characteristics of the mitigation bank and how it will be established and operated. The information required to be included in the draft instrument is detailed in 33 CFR 332.8(d)(6) Mitigation Banks and In-Lieu Fee Programs, Review Process – Draft Instrument (see checklist in Appendix 5 of this document). The document will be distributed to the IRT for review and comment. At the end of the comment period, all comments will be discussed with the IRT and the sponsor in an effort to resolve issues. The Corps will inform the sponsor whether the draft instrument is generally acceptable and what changes, if any, are required. If there are significant unresolved concerns that may lead to a formal objection from one or more IRT members to the final instrument or amendment, the Corps will inform the sponsor of the nature of those concerns. For ease of review and consistency, the format in Appendix 6 (table of contents) should be followed for bank instrument submittals.

Step 4: Final Bank Instrument - To establish a mitigation bank, a final bank instrument must be submitted for approval. This final bank instrument submittal must include supporting documentation that explains how the final instrument addresses the comments provided by the IRT. The sponsor must provide the final instrument directly to all members of the IRT. The Corps will notify the IRT members whether or not they intend to approve the instrument. If no IRT member objects, the sponsor will be notified of the final decision. If the instrument is approved, arrangements will be made for it to be signed by the appropriate parties. If any IRT member initiates the dispute resolution process, described in 33 CFR 332.8(e), the Corps will notify the sponsor. Following conclusion of the dispute resolution process, the Corps will notify the sponsor of the final

decision. If the instrument is approved, the Corps will arrange for it to be signed by the appropriate parties. The sponsor shall provide the Corps an electronic version of the bank instrument on a CD.

It should be noted that it is the policy of federal agencies to make records available to the public to the greatest extent possible, in keeping with the spirit of the Freedom of Information Act (FOIA), 5 U.S.C. § 552, while at the same time protecting sensitive information. The FOIA provides exemptions to protect sensitive information in Part 552(b), including Exemption 4, which protects "trade secrets and commercial or financial information obtained from a person [that is] privileged or confidential." This exemption is intended to afford protection to those submitters who are required to furnish commercial or financial information to the government by safeguarding them from the competitive disadvantages that could result from disclosure.

SECTION 4: SITE SELECTION

Selection of appropriate sites is critical to maximizing the effectiveness of wetland restoration, establishment, or enhancement as well as ensuring long-term ecological sustainability of the bank site. The IRT will only consider sites with high potential for wetland success to better ensure that long-term mitigation goals are achieved. The sponsor should be interested in appropriate sites to improve their ability to effectively and efficiently develop the types of wetlands desired under the banking program.

In general, wetland mitigation bank sites should contain features that make the site conducive to the development of high quality wetlands that:

- replace the desired type of wetlands (typically the same as what is being lost)
- provide multiple functions
- are appropriate for the landscape
- are compatible with surrounding land use
- can be managed in a relatively easy and sustainable manner
- are ecologically of the highest quality achievable and compatible with current and historic site conditions

Potential bank sites will be evaluated using the criteria listed below. All criteria must be addressed to the satisfaction of the IRT. Potential sponsors should seriously consider the ability of a proposed site to meet these criteria prior to submitting any information to the IRT. The sponsor should address these criteria as early in the process as possible (e.g., preliminary drafts).

Ownership: The proposed ownership arrangements for the bank site must be provided in the prospectus. The bank site shall be owned or under the full control of the bank sponsor by the time a draft bank instrument is submitted. The sponsor should own the full bundle of rights for the site. In general, the IRT will not consider sites with some property rights (e.g., flowage easements, gas/oil rights, mineral rights and other easements, etc.) that are outside the control of the bank sponsor. However, the IRT may consider sites where it can be demonstrated that these other rights will not, in any way, negatively impact the ability of the site to be developed and managed as a high quality

wetland. Private lands enrolled in publicly-funded conservation programs will not be considered for banks as long as the land is still under contract, easement or similar agreement which limits the use of the land. The sponsor shall provide documentation of ownership in the form of a deed or agreement between the sponsor and the legal owner of the property regarding use of the property and protection in perpetuity. If the property was purchased using public grant money, the sponsor is responsible for providing documentation from the grantor showing that a mitigation bank is compatible with the grant agreement.

Relationship to other Programs: Except for projects undertaken by federal agencies, or where federal funding is specifically authorized to provide compensatory mitigation, federally-funded aquatic resource restoration or conservation projects undertaken for purposes other than compensatory mitigation, such as the Wetlands Reserve Program, Conservation Reserve Program and Partners for Wildlife Program activities, cannot be used for the purpose of generating compensatory mitigation credits for activities authorized by the Corps and/or Ohio EPA permits. However, mitigation credits may be generated by activities undertaken in conjunction with, but supplemental to, such programs in order to maximize the overall ecological benefits of the restoration or conservation project.

Soils: At least a majority of the area targeted for wetland re-establishment shall contain hydric soils. The presence and extent of hydric soils and hydric inclusions in non-hydric soils should be confirmed based on field verification of soil mapping (if listed as hydric) or use of hydric soil indicators. Soils may have been altered through tillage, oxidation of organic soils or burial under sediment deposits; these changes should be noted to determine their potential effect on wetland restoration/establishment/enhancement. If earthen structures are to be built as part of the plan, the soils must be clean and suitable for use as fill material. Berms must be constructed so that they are structurally sound and will not be damaged by burrowing wildlife such as muskrats.

Hydrology: The hydrology of the site (whether natural or altered) shall be such that it can be restored or maintained to develop the appropriate conditions for the desired wetland. Sites with some manipulation of the hydrology (surface ditches, subsurface tile, diversions, levees, etc.) are preferred as that provides the best opportunity for re-establishment of appropriate hydrology. The source of hydrology for the site must be documented and be sufficient to provide the desired duration, depth and timing of hydrology. Typically, detailed water budgets are not necessary to determine whether sufficient water quantity exists if simple hydrology restoration techniques are used. More complex hydrology enhancements may require development of data to support the predicted hydrology. Whenever possible, sites should provide water in an energy-efficient manner such as surface flow or naturally-occurring high water tables. Processes that require large amounts of water movement, such as pumping or diversions, should be avoided because of high operation and maintenance expense. In addition, the quality of water to drive the hydrology should be examined. Water sources that could introduce unacceptable levels of pollutants (nutrients, pesticides, etc.), sediment or invasive species shall not be used.

Existing Vegetation: To fully demonstrate a re-establishment of wetland functions on the site, existing vegetation should be dominated by non-wetland plant communities. For preservation or rehabilitation sites, a wetland plant community can exist on the site; the extent will be based on verified wetland delineations. The presence and extent of invasive plant species shall be recorded. Significant coverage by invasive plants may make a site unsuitable for use as a bank. If eradication of invasive plants in wetlands is the basis for rehabilitation credits, a plan outlining the short-term and long-term methods for control of the plants must be developed. The IRT will determine if the site is appropriate based on the likelihood of the plan's success.

Unique Features: The presence of unique features such as federally or state-listed endangered species, rare plant communities, dedicated natural areas, and archaeologically or culturally significant sites shall be documented. To be consistent with the intent of banking as part of the strategy to conserve wetland resources, special attention should be placed on unique or high quality wetlands on the site. If any such features are present, the development of the site must not adversely affect these features. However, if protected, the presence of these features may improve the value of the site as a mitigation bank.

Hazardous Substances: The site shall be free of all state and federal listed hazardous wastes and substances, including, but not limited to, underground tanks, pesticides, petroleum spills, commercial/industrial wastes or illegal dumps. This determination will be confirmed by the completion of an approved environmental assessment, such as ASTM E1527 - 05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, conducted by an experienced person.

Adjacent Land Use: Land use near the bank site may impact its ability to develop high quality wetlands. Adjacent land use may adversely impact the restoration of hydrology or vegetation on the site or compromise the site's ability to provide functions such as wildlife habitat. Both current and projected land uses should be considered by the sponsor. Sites with adjacent land uses that will have off-site impacts on the bank site are discouraged unless there are means to offset these impacts. Buffers of adequate size (minimum 50 meters, measured from the boundaries of existing or proposed wetlands) and composition should be included to reduce impacts of adjacent land uses. Vegetated open water areas can qualify as buffer in some instances (if native vegetation). In addition, the compatibility of the wetland bank site with surrounding land uses should be considered relative to the public's perception of the site. Adjacent land use may also improve the desirability of a site for wetland mitigation banking. Sites that expand or improve the quality of adjacent aquatic resources are preferred; this is particularly beneficial if the adjacent land is publicly owned or under a conservation easement.

Inclusion in Land Use Plan: Preference should be given to sites that have been identified for wetland conservation as part of an approved plan. These plans may include watershed plans, conservancy districts, open space plans, habitat restoration plans or other local or regional land use plans.

Service Area Considerations: When selecting a location for a mitigation bank, the bank sponsor should consider applicable state and federal rules, which specify that mitigation

should be located where it is most likely to successfully replace lost functions and services using the watershed approach. Therefore, to provide the ecological replacement of lost functions and services, in-kind replacement, use of the watershed approach and the location of the compensation site relative to the impact site will be considered by the IRT. This approach will prevent substantial impacts from being mitigated at banks too far removed from the site where the functions and services are lost. In order to achieve this goal, bank service areas will typically be designated as follows:

Bank Service Areas:

- The entire Ohio portion of the Corps District in which the bank is located for:
 - all jurisdictional and isolated Category 1 wetlands of any size; and
 - isolated Category 2 wetlands of 0.5 acre and less.
- The 8-digit HUC in which the bank is located for all other wetland impacts. See Appendix 2 of this document for 8-digit HUCs.

Note: Prospective bank sponsors should consider that, in cases where multiple active banks are located within the same service area, in-kind replacement, use of the watershed approach and the location of the compensation site relative to the impact site typically are considered when evaluating acceptable replacement. Compensatory mitigation located within the same sub-watershed as the impacts is generally preferred.

SECTION 5: LONG-TERM MANAGEMENT & MAINTENANCE OF BANK SITES

Wetland mitigation bank sites of all types represent a consolidation of wetland mitigation into a single location. Thus, a single mitigation bank site can literally represent the loss of hundreds of acres of wetland habitat from across the bank's approved service area. It is with this in mind that the IRT believes special provisions need to be made to help ensure a bank's long-term functionality. A long-term management plan must be provided that describes how the project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource. This long-term management plan must include the following:

1. Identification of the party responsible for ownership and all long-term management of the site. A major factor in a wetland bank site remaining viable as high quality habitat is the selection of an adequate long-term manager of the site. Therefore, identification of a long-term manager is necessary for each site. The long-term manager is the person or entity who will assume long-term management and maintenance of the wetland mitigation bank site. Special consideration needs to be given to who will assume long-term management and maintenance of wetland mitigation bank sites. It is strongly encouraged that wetland sponsors develop a partnership with a federal, state or local governmental conservation entity with long-term viability and a proven track record in wetland habitat management to provide for the long-term management and maintenance of the bank site. Non-governmental conservation organizations (NGOs) will be considered and approved on a case-by-case basis. NGOs proposed as long-term managers will be evaluated on their previous record of wetland habitat management, future plans for the site, proximity to the bank site, and organizational long-term viability.

The long-term manager should be one that provides opportunities for public access for education or various forms of low-impact recreation. Proposed ownership arrangements and a long-term management strategy must be identified at the time the prospectus is submitted to the Corps. This includes information documenting the agreement between the sponsor and the long-term manager. The long-term manager must be a signatory to the banking instrument. The long-term manager is strongly encouraged to be an active participant throughout the design and approval process.

The long-term manager must protect in perpetuity the mitigation bank and the resources it provides, through an appropriate real estate arrangement such as a conservation easement. Documentation of these agreements must be provided in the mitigation banking instrument. Also a statement shall be included in the mitigation banking instrument that requires prior approval by the IRT of any proposed replacement for long-term management should the initial long-term manager become defunct or otherwise abandon the long-term management responsibilities.

2. A description of the long-term management needs, the annual cost estimates of those needs, and the funding mechanism used to meet those needs. A wide range of factors can dramatically affect the cost of maintaining a wetland, especially one that relies on dikes and water control structures for its functionality. Examples of these factors include, but are not limited to, muskrat and beaver damage, flood damage, water control structure failure, vandalism, and invasive species control. Long-term management needs must be described in the mitigation banking instrument as well as annual cost estimates for those needs and identification of the funding mechanism that will be utilized to meet the needs (see Section 6: Financial Assurances). Documentation must be provided as proof of financial assurances.

SECTION 6: FINANCIAL ASSURANCES

Short-term Contingency: The bank sponsor is responsible for securing financial assurances to cover contingency actions in the event of bank default or failure. In determining the assurance amount for short-term contingency actions, the Corps and Ohio EPA, in consultation with the IRT, will consider (but will not be limited to) the costs of mobilization, construction, operations, and monitoring, as well as past performance of the bank sponsor, project complexity, and likelihood of success. Detailed cost estimates must be presented in the banking instrument, or earlier if the sponsor chooses. Estimates must cover costs for the site design (planning and engineering), purchase (land acquisition), legal fees, construction, grading, re-grading contingency, sediment and erosion control, planting, replanting contingency, invasive plant control, maintenance, and monitoring for all restored (re-established or rehabilitated), established, enhanced or preserved aquatic resources and upland buffers in the bank.

Financial assurances may be in the form of irrevocable letters of credit, escrow accounts, performance bonds, or other appropriate instruments. Financial assurances shall avoid all foreseeable conflicts of interest. Once deposited, the funds may not be used or withdrawn by the sponsor unless approved by the district engineer and Ohio EPA, in consultation with the IRT. Sufficient financial sureties must be maintained until all performance measures have been met, all credits have been sold, and management of the

bank has been transferred to the long-term manager. Funds will generally be released back to the sponsor incrementally as specified criteria are met (e.g., complete construction, complete plantings, etc.) but will be forfeited by the sponsor in the event of default (see Section 12: Default Plan). A proposed schedule for release of the financial surety following completion of specific tasks associated with the establishment of the bank must be included in the instrument. Financial assurances must be in a form that ensures that the Corps will receive notification at least 120 days in advance of any termination or revocation. For third party assurance providers, this may take the form of a contractual requirement for the assurance provider to notify the Corps at least 120 days before the assurance is revoked or terminated. The Corps cannot accept directly, retain, or draw upon financial assurances. However, financial assurances shall be payable at the discretion of the district engineer to his designee or to a standby trust agreement identified in the financial instrument.

Long-term Management: The bank sponsor must provide adequate funds for long-term management of the bank site following transfer to the long-term manager. Appropriate long-term financing mechanisms include non-wasting endowments, trusts, contractual arrangements with future responsible parties, and other appropriate financial instruments. In cases where the long-term management entity is a public authority or government agency, that entity must provide a plan for long-term financing of the site. The banking instrument must include a comprehensive list of long-term management needs and annual cost estimates for those needs. Long-term management needs may include, but are not limited to, invasive plant control, maintenance of water control structures, site access restriction, monitoring, administrative costs, etc. The instrument must also identify the financing mechanism and detail how the mechanism will generate sufficient management funds in perpetuity, including inflationary adjustments and other contingencies. The long-term management fund may be funded fully following the initial credit release or incrementally with each credit release or each credit sale. Transfer of long-term management funds in case of default must also be addressed in the agreement between the sponsor and the long-term manager.

Providing financial assurances for long-term management of the bank is the responsibility of the sponsor, including when long-term management responsibility is transferred to a publicly funded entity. The sponsor must document that long-term management funds transferred to the long-term manager will only be used for management of the bank.

Annual Reporting: Documented proof of financial assurances (both short-term contingency and long-term management) shall be submitted to the Corps and the IRT by December 31 of each calendar year. Annual documentation must show beginning and ending balances including deposits into and any withdrawals from the accounts providing funds for short-term contingency and long-term management. Failure to comply with the requirements of this Section may be grounds for suspension and/or revocation of the bank instrument. The annual reports should also include information on the amount of required financial assurances and the status of those assurances, including their potential expiration.

SECTION 7: ADAPTIVE MANAGEMENT PLANS

The overall goal of adaptive management is to assure the long-term viability of the mitigation bank site. The focus of adaptive management should be on taking measures to achieve performance standards and satisfy the objectives of the mitigation bank. Routine monitoring and minor maintenance tasks are intended to assure the viability of the bank site in perpetuity. The approach to the management of the bank site's resources is to conduct annual site investigations and monitoring of selected characteristics to determine stability and ongoing trends of the restored, established, and/or preserved waters of the United States, including wetlands. While it is not anticipated that major management actions will be needed, an objective of this management plan is to conduct monitoring to identify any issues that arise, and use adaptive management to determine what corrective actions are appropriate.

As part of the banking instrument, the sponsor must outline a management strategy to address unforeseen changes in site conditions or other components of the mitigation project. An Adaptive Management Plan (AMP) is part of the mitigation plan; it specifies the procedures that will be in place to address potential changes in site conditions or other components of the compensatory mitigation project. The intent of an AMP is to identify a management strategy for corrective action in the event the site does not perform as proposed. An AMP can be thought of as a contingency plan that will provide details of what actions will be taken to correct site specific issues that arise which prevent the site from meeting the performance measures. Adaptive management includes those activities necessary to address the effects of foreseeable and unforeseen circumstances that affect goals, objectives and the long-term success of the bank. These may include climate change, fire, flood, and other natural or catastrophic events. Examples of some adaptive management actions include, but are not limited to, replacing dead or dying plants, changing hydrological regimes, controlling the degree of erosion, repairing and/or maintaining structures to assure appropriate operating conditions and removing invasive or exotic species. Adaptive management plans include information regarding corrective actions that will be taken, as well as the party or parties responsible for implementing adaptive management measures.

Management decisions that deviate from the approved mitigation plan require IRT approval. However, a certain amount of responsiveness to conditions on the ground should be built into the mitigation plan itself. Before considering any adaptive management changes to the mitigation plan, the IRT will consider whether such actions will help ensure the continued viability of a bank's biological resources. Therefore, the sponsor should include the following as part of their AMP:

1. Project Background: state the project objectives, performance standards and methods for monitoring, discuss quality assurance and quality control measures and how monitoring data will be used for interpretation and reporting.
2. Problem Identification: discuss the rationale for identifying problem areas and/or determining that a site is not meeting the performance criteria and would not likely meet the performance criteria, unless corrective action is taken.
3. Corrective Action: identify specific and measurable steps that will be taken to correct problems identified (in step 2), as well as time frame for implementing

and monitoring corrective actions. Additional steps to refine corrective actions can also be discussed.

If the sponsor, the Corps or Ohio EPA, in consultation with the IRT, identify site specific issues that are either foreseeable or unforeseen or affecting performance goals, which have not been addressed in the mitigation plan, then the sponsor will take immediate action to work with the team to receive written approval to implement the appropriate adaptive management actions. If the action is necessary due to performance (i.e. monitoring data clearly indicates that the site or any portion thereof is not going to meet one or more of the performance goals established in the mitigation plan), the sponsor must develop site specific adaptive management measures to correct the deficiencies. The proposed adaptive management measures must be submitted to the IRT within 3 months of receipt of written notification of deficiencies from the Corps or Ohio EPA. Within 60 days of receipt of the proposed adaptive management measures, the IRT must provide written acceptance of the submitted plan or a modified plan acceptable to the IRT. If the sponsor objects to the IRT's changes to the submitted plan then the sponsor should notify the IRT within 15 days of receipt of the changes. The IRT will consider the sponsor's objections and either make further changes or direct the sponsor to proceed as originally modified. The adaptive management measures shall be implemented within 6 months.

SECTION 8: PERFORMANCE STANDARDS

Wetland Criteria: Released credits must meet wetland criteria {Corps of Engineers Wetland Delineation Manual (1987) and any subsequent versions/updates and all relevant regional supplements}. In addition to delineating exterior wetland boundaries, non-wetland inclusions (e.g., open water, upland) must be identified.

The Vegetation Index of Biotic Integrity (VIBI) is a robust analysis of wetland ecologic condition, which has been calibrated to a wide variety of community types, hydrogeomorphic (HGM) classes, and ecoregions across Ohio. This peer-reviewed, nationally accepted and respected method has been the standard tool for assessing wetland condition in both natural and mitigation wetlands in Ohio for much of the past decade. In addition to mitigation banks, it is also a standard 401 permit requirement for monitoring permittee-responsible compensatory mitigation. The Integrated Wetland Assessment Part 6 report, entitled *Standardized Monitoring Protocols and Performance Standards for Wetland Creation, Enhancement and Restoration, Version 1.0* (available on the internet at:

http://www.epa.ohio.gov/portals/35/wetlands/PART6_Std_Mitigation_Protocols.pdf) states that “a VIBI score specific to the wetland type (HGM class, plant community), location (ecoregion), and quality will be a required performance goal for most mitigations” (section 1.4.7.1; page 7).

Additionally, several of the specific performance goals required of wetland mitigation banks in Ohio can directly use data collected as part of the standard VIBI monitoring protocols to easily document whether or not these goals are being met. The Ohio Rapid Assessment Method (ORAM) for wetlands was not developed to evaluate the success of

mitigation projects and its use in this manner is not appropriate (ORAM v. 5.0 User's Manual, page 7).

Ecological Condition (IBI Score): Meet or exceed the "Wetland Habitat" VIBI score for an emergent plant community for the appropriate HGM class for the ecoregion where the mitigation bank resides. This score should be determined from the column labeled "WLH (Category 2)" on Table 8 (page 15) of the report entitled "Addendum to: Integrated Wetland Assessment Program. Part 4: Vegetation Index of Biotic Integrity for Ohio wetlands and Part 7: Amphibian Index of Biotic Integrity for Ohio wetlands" or subsequent updates. In some instances meeting a Wetland Habitat Amphibian Index of Biotic Integrity (AmphIBI) score may be required in addition to or instead of the VIBI score. Further information on the VIBI and the AmphIBI can be found on the internet at: http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection_reports.aspx.

In order to demonstrate that this IBI score performance goal is being met, following each VIBI monitoring event (see Section 9: Monitoring and Reporting for schedule), VIBI scores will be calculated using data aggregated from all random modules established within each bank sub-area. These bank sub-areas are determined based on hydrologic breaks and major plant community types. Additionally, a VIBI score will be calculated for each fixed plot. Changes in aggregation of random modules due to changes in community types should be coordinated with and approved in writing by the IRT, but does not require modification of the banking instrument.

Plant Establishment Wetland credits will have a composition of at least 75% relative cover of native perennial hydrophytes (FAC, FAC+, FACW(+/-) and OBL) as indicated in National List of Plant Species that Occur in Wetlands [Region 1] (Reed, P.B., Jr. 1988. U.S. Fish and Wildlife Service Biological Report 88(26.1). 111 pp.) or successor documents.

VIBI field data should be used to demonstrate whether or not this goal is being met. For each aggregated bank sub-area, a percent relative cover of native perennial hydrophytes should be calculated. Additionally, average percent relative cover of native perennial hydrophytes should be calculated as a single value for each fixed plot.

Invasive Species: Appendix 7 of this document includes all plant species considered to be potential invasive threats within wetland mitigation banks and their associated buffer areas. The table found in Appendix 7 is subject to change as new species are determined to be invasive within the Ohio flora. Additionally, site conditions present at each bank may require that the list be expanded to incorporate additional invasive species, depending on the specific upland or wetland habitat(s) being restored. Eradication of these species should be accomplished as soon as possible once they are identified within the mitigation bank. At a minimum, the following performance standards are required:

- Wetland acreage available for credit release will have less than 5% relative cover of all non-*Typha* invasive plant species listed in Appendix 7. Due to the difficulty of distinguishing the three species of cattails (*Typha latifolia*, *Typha angustifolia*, and *Typha x glauca*), as well as the likelihood that at least one of these will be

present in many types of Ohio wetlands, the total relative cover of all invasive species, including *Typha spp.*, will be less than 10%.

- Upland areas proposed for buffer credits will also have less than 5% relative cover of non-native invasive plant species listed in Appendix 7.

VIBI field data should be used to demonstrate whether or not this goal is being met. For each aggregated bank sub-area, a percent relative cover of *Typha spp.* and a percent relative cover for all other invasive species in Appendix 7 should be calculated. Average percent relative cover for *Typha spp.*, and average percent relative cover for all other invasives should also be calculated as a single value for each fixed plot.

Even if the overall percent of invasive species is less than five percent, in no circumstance shall a predominance (i.e., > 50%) of invasive species constitute more than one continuous acre of relative cover. Since invasive species are generally not randomly distributed within a wetland, in addition to the VIBI analysis discussed above, a site map identifying areas greater than 0.1 acre within the bank that are dominated by any invasive species listed in Appendix 7 should be submitted with each monitoring report.

Forested Habitats: In addition to the other performance standards for bank credits, forested credits (including wetland and upland buffer areas) will only be released when it can be demonstrated, to the satisfaction of the IRT, that all forested areas available for credits are developing into a successful forested ecosystem. This demonstration is made by graphing basic forestry measures, including frequency, density, and dominance per species against time. Detailed methodology for documenting forest development using standard forestry metrics is included in Section 9: Monitoring and Reporting.

In order to provide the forested habitat with an adequate diversity of species, the following planting guidelines must be followed:

1. a minimum of 200 native, free standing, live and healthy (disease and pest free) trees per acre;
2. a minimum of 8 native tree species are planted within the forested areas, and each of these 8 species represents at least 5% of the overall tree count;
3. a minimum of 25% of all live trees planted consist of at least 4 species having coefficient of conservatism values from 5 to 10. Coefficient of conservatism values can be found on the internet at: http://epa.ohio.gov/portals/35/wetlands/Ohio_FQAI.pdf;
4. a minimum of 200 native, free standing, live and healthy (disease and pest free) shrubs/sub-canopy tree species per acre;
5. a minimum of 8 native shrub/sub-canopy species are planted within the forested areas, and each of these 8 species represents at least 5% of the overall shrub/sub-canopy tree count; and
6. a minimum of 25% of all live shrubs/sub-canopy trees planted consist of at least 4 species having coefficient of conservatism values from 5 to 10 (http://epa.ohio.gov/portals/35/wetlands/Ohio_FQAI.pdf).

Lists of species to be planted should be provided with each submittal and require the approval of the IRT. Only species considered to be native within the same Level IV ecoregion as the location of the bank should be included in the planting and seeding plan (Woods, A.J., J.M. Omernik, C.S. Brockman, T.D. Gerber, W.D. Hosteter, and S.H. Azevedo. 1998. Ecoregions of Indiana and Ohio [2 sided color poster with map, descriptive text, summary tables, and photographs]. U.S. Geological Survey, Reston, VA. Scale 1:500,000).

It is anticipated that as the forested areas within any given bank develop over time, the community composition will shift to those species best adapted to the site conditions present within the bank. Natural recruitment of native woody species is also expected to occur, and it is not the intention of the IRT to have these volunteers eradicated. Therefore, the only specific performance goal that must be met for developing forested areas is as follows:

- A minimum of 400 native, live and healthy (disease and pest free) woody plants per acre (of which at least 200 are tree species) must be present at the end of the monitoring period.

In order to ensure that the above numbers are met at the end of the monitoring period, the sponsor may choose to increase the number of initial plantings for trees and shrubs to something greater than 200 of each, especially in areas where natural recruitment of woody volunteers is not likely to occur.

Rehabilitation: Areas proposed for rehabilitation credit must have baseline vegetation assessments conducted. The resulting VIBI scores will be used to establish the performance goals for the rehabilitation credits. Rehabilitation credits are not eligible for upfront release. All performance goals must be met prior to release of these credits. Goals for rehabilitation of plant communities are as follows:

- Must meet VIBI scores equivalent to or higher than the threshold for Wetland Habitat (mid-level of Category 2) or increase VIBI score 10 points from baseline score, whichever is higher.
- Other goals that must be met for all rehabilitation:
 - < 5% relative cover of invasive species - However, if *Typha* species account for more than 5% relative cover, then the total of invasive species plus *Typha* species must be less than 10% relative cover; and
 - > 75% relative cover of native perennial hydrophytes

Other goals targeting additional wetland functions and services may be proposed and will be evaluated on a case by case basis.

SECTION 9: MONITORING AND REPORTING

Monitoring of mitigation bank sites should occur in a manner that allows the data collected to specifically indicate whether the performance standards and other goals of the bank are being met. The type of monitoring to be undertaken, the number of sample

locations, the frequency of sampling and the measurements to be recorded will all vary with each proposal. Sponsors should present a monitoring plan to the IRT that will provide the information necessary to determine if credit releases should be authorized and if and where remedial actions are required. The information collected during monitoring events should be presented in the monitoring reports in a format that will allow ease of those determinations.

The parameters monitored at any given bank will vary. However, there will be some monitoring that is common to all banks. The ecologic condition will be required to be established through generation of VIBI scores. Percent relative cover of native perennial hydrophytes and percent relative cover of invasive species will also need to be determined. Areas of non-forested wetland, forested wetland, unvegetated open water, upland islands, invasive species dominance and upland buffer will need to be delineated, measured and mapped. For forested credits, basic forestry measures by species should be extracted from the VIBI data to demonstrate woody species establishment. Therefore, those attributes should be recorded. Hydrology measures and soil and water chemistry data should be collected for each wetland area.

Some banks, depending on established goals, will have additional monitoring requirements. These requirements may include calculation of AmphIBI scores, scoring an index for a different taxonomic group, measuring specific ecological services/functions the bank wetlands are performing, or other wetland assessments.

The table below gives the common wetland monitoring items and a time scale of when and how often they should occur and be reported during the ten-year monitoring period.

Table 1. Conceptual 10 year schedule for required monitoring and reporting of bank sites

Monitoring activity	Years										
	0	1	2	3	4	5	6	7	8	9	10
Delineation		X		X		X		X			X
Hydrologic monitoring		X	X	X	X	X	X	X	X	X	X
Vegetation sampling		X		X		X		X		X	
Amphibian sampling		X		X		X		X		X	
Soil and water sampling		X		X		X		X		X	
Other taxa group sampling		X		X		X		X		X	
Mapping, % relative covers		X		X		X		X		X	
Ecological services		X		X		X		X		X	
As-built report	X										
Annual report		X	X	X	X	X	X	X	X	X	X

NOTE: While conducting delineations one should follow the Corps of Engineers Wetland Delineation Manual (1987) and any subsequent versions/updates and all relevant regional supplements.

Placement and Number of Monitoring Plots: Perhaps the most important decision in the monitoring of bank sites is the selection of adequate numbers and locations of sample plots to provide an accurate characterization of the entire range of conditions generated by the project. Since most bank sites are large it should be understood that capturing the variation across the bank will require numerous sampling locations. More data collection areas are required for sites that are larger, have a diversity of wetland communities, or have similar communities in different levels of development or of varying quality. Sampling locations should be placed in a manner that is representative of all of the site conditions. This will require both targeted and randomly selected monitoring locations. More sampling locations result in data that better represent site conditions. It is far better to have too many sampling locations than too few. The additional number of samples will more closely represent the true site conditions. The draft instrument should include a site plan which shows where all hydrological monitoring wells and plant sampling locations will be established.

A rough guide for the number of VIBI monitoring plots that should be established at a bank is one fixed plot for every dominant plant community in a wetland area and one random plot for every 2.5 acres (1 hectare) of the bank site. This is the bare minimum of plots necessary and, as mentioned above, more fixed and random plots may be required where marked differences exist in the community or communities being monitored. The anticipated location of fixed and random plots should be shown on the final mitigation work plan included in the banking instrument.

Reporting Monitoring Data: The sponsor must demonstrate to the IRT which areas of the bank are performing at a high enough level to warrant credit releases. Credit releases will be based upon data collected and presented in the monitoring reports. Data or statistics averaged across the entire bank site do not provide the type of information needed to make determinations about releasable credits. Data should be presented to correspond with the credits the sponsor is proposing for release. Additionally, all performance standards measured for each random or fixed plot should be reported by aggregate bank sub-areas. Data should reflect how those specific areas of the bank are performing in relation to their performance standards. In addition, monitoring reports should include sampling results for previously released credits to assure they are still performing at an acceptable level to warrant additional releases. Data on the remainder of the bank site (i.e., credits not previously released or currently proposed for release) is also critical to allow an overview of how those areas are performing and whether any type of remedial action is needed to increase their likelihood of meeting performance standards.

Monitoring data from multiple years should be presented in a uniform format. This helps the IRT to more easily determine which sub-areas of the bank are meeting interim or final performance goals specified in the banking instrument. To properly evaluate the performance of bank sub-areas the following information should be submitted in table format, for the 1st and all subsequent annual monitoring events, with the following information from each individual bank sub-area (based on aggregated random VIBI modules) as well as each fixed plot:

- Bank Sub-area Name/VIBI Fixed Plot #

- Area represented by each bank sub-area (in acres)
- Percentage of delineated wetland the sub-area represents within the entire bank
- Number of random VIBI modules included in aggregation
- VIBI score
- % Relative Cover Native Perennial Hydrophytes
- % Relative Cover all Invasive Species listed in Appendix 7
- % Relative Cover *Typha* spp.
- Indicate if all interim goals met for each sub-area

See Appendix 8 of this document, including Table A-8.1 for an example.

Plots will be evaluated using the information specified above to determine if they are meeting the interim or final performance goals. To calculate the percent native perennial hydrophytes for each plot, calculate the sum total of the relative cover of all native perennial species having an indicator status of FAC, FAC+, FACW-, FACW, FACW+, or OBL. The percent non-*Typha* invasive calculation for each plot is made by totaling the relative cover for all invasive species from the Appendix 7 list present within each module (with the exception of those in the genus *Typha*). A separate percent *Typha* spp. calculation is made in a similar manner by totaling the percent relative cover for *Typha angustifolia*, *T. latifolia*, and *T. x glauca*. When reporting a summary for percent native perennial hydrophytes, percent non-*Typha* invasive species, and percent *Typha* spp. over the entire site, please only use the random VIBI plots, as discussed on pages 23-24 of the Ohio EPA Report “Integrated Wetland Assessment Program. Part 6: Standardized Monitoring Protocols and Performance Standards for Wetland Creation, Enhancement and Restoration, Version 1.0 Ohio EPA Technical Report WET/2004-6.” This document is available on the internet at:

http://epa.ohio.gov/portals/35/wetlands/PART6_Std_Mitigation_Protocols.pdf.

Forested Habitat: Additionally, for fixed and random plots falling within forested restoration areas, basic forestry metrics of density, dominance, and diversity for each woody species present must be reported by sampling year. These statistics should be calculated for each fixed plot individually and for each bank sub-area based on aggregated random plots and can be derived from the standard woody species VIBI sampling in the following manner:

- Frequency: A measure of species distribution across the site, calculated as the percentage of modules occupied by a given species. Divide the number of modules in which a species occurs by the total number of sample modules (i.e. divide by 10 for each fixed plot, and by the number of random plots).
- Density: The average number of individuals per unit area (i.e. trees per acre or hectare). Simple stem count for each species divided by the area of each fixed plot (0.1 hectare or 0.25 acre) and for all random plots (0.025 acre or 0.01 hectare per random plot).
- Relative Density: The density of one species divided by the total density for all species present.
- Dominance: The average dominance for each species within the study area is estimated by its total basal area per unit area (square feet per acre or square

meters per hectare). Basal area (BA) is a unit of tree size that is determined from stem diameter. It is equal to the cross-sectional area of a tree stem measured at 4.5 ft (1.37 m) above the ground. This value is normally obtained by measuring diameter at breast height (dbh) and can be calculated using one of the following equations:

- $BA \text{ in ft}^2 = dbh^2 \text{ (inches)} \times 0.005454$
- $BA \text{ in m}^2 = dbh^2 \text{ (cm)} \times 0.00007854$

Since the VIBI protocol places trees in one of several size classes, assign the midpoint of the size class as the basal area for each woody plant (e.g., a stem in size class “3” [5 – 10 cm], would be assigned a dbh of 7.5 cm).

Reporting of forestry data should appear in a separate table as follows:

- Sub-Area Name/VIBI Fixed Plot #
- Species (one row per species, including “Total Tree Species” and “Total Sensitive Tree Species” (CofCs > 5) row for each plot)
- Frequency (1st year and all subsequent monitoring years)
- Density (1st year and all subsequent monitoring years)
- Relative Density (1st year and all subsequent monitoring years)
- Dominance (1st year and all subsequent monitoring years)

Once all of this information has been calculated and reported, the IRT will be able to assess the site conditions and determine if additional credit releases are warranted, and, if so, the number of credits to be approved for release. It should be noted that the interim releases are available only if the plots are progressing at a reasonable rate.

Delineations: Since determination of the number of acres of wetland present is critical, wetland delineations must be carried out using the methods described in the Corps of Engineers Wetland Delineation Manual (1987) and any subsequent versions/updates and all relevant regional supplements. Wetland and non-wetland areas must be clearly delineated to allow an accurate determination of which areas are meeting the “wetland” performance standard. Precise wetland boundaries are also important for determining upland buffer credits and areas of unvegetated open water.

Hydrology: Amount and duration of inundation and saturation is a critical factor in developing the amounts and types of wetlands desired. The IRT recommends that automatic recorders be used to provide information on surface and ground water elevations. At least one automatic recorder should be placed within each wetland area at the bank site. Automatic recorders should typically be located near the perimeter of the wetland, where they can provide data on both surface and ground water levels without being overtopped during periods of maximum inundation. In some instances it may be more practical to install two automatic recorders in each wetland area. One recorder should be placed at the location of deepest inundation and attached to a stake so it just touches the wetland substrates to record surface water levels and another should be placed at or near the perimeter, two to three feet into the substrate, to record ground water

levels. It is recommended that readings be taken twice a day and the data be presented as hydrographs (water depths versus dates). Locations of monitoring wells should be shown on the final site development plans included in the banking instrument.

Additional References: The above considerations are basic to developing an effective monitoring and reporting plan. Specifics on monitoring to determine conformance with performance standards as well as additional guidance on essential elements of a monitoring and reporting plan and how monitoring goals can be best achieved is presented in the Mitigation Bank section of the document “Integrated Wetland Assessment Program. Part 6: Standardized Monitoring Protocols and Performance Standards for Wetland Creation, Enhancement and Restoration, Version 1.0 Ohio EPA Technical Report WET/2004-6” available on Ohio EPA’s website at:

http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection_reports.aspx

The following documents are available at the above web site and are valuable in establishing and carrying out a monitoring plan and reporting the results:

- Integrated Wetland Assessment Program. Part 4: Vegetation Index of Biotic Integrity (VIBI) and Tiered Aquatic Life Uses (TALUs) for Ohio wetlands. 2004.
- Integrated Wetland Assessment Program. Part 7: Amphibian Index of Biotic Integrity (AmphIBI) for Ohio Wetlands. 2004.
- Addendum to: Integrated Wetland Assessment Program. Part 4: Vegetation Index of Biotic Integrity for Ohio wetlands and Part 7: Amphibian Index of Biotic Integrity for Ohio wetlands. 2006.
- Integrated Wetland Assessment Program. Part 9: Field Manual for the Vegetation Index of Biotic Integrity for Wetlands v. 1.4. 2007.
- Automated Spreadsheets for Calculating and Reporting the Vegetation Index of Biotic Integrity (VIBI) Metrics and Scores v. 1.0.1. 2007.

SECTION 10: CREDIT RELEASE SCHEDULE AND CRITERIA

All credit releases including the first release must be authorized by the Corps in writing to the sponsor before any credits may be sold. Under no circumstance should credits be sold prior to this written authorization. Failure to comply (including over selling), will result in consequences including but not limited to: decrease of credit sales, suspension of future credits, etc. [see 33 CFR 332.8(o)(10)].

Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS): RIBITS is an interactive website designed to track the status of mitigation banks and in-lieu fee programs by Corps District; it provides up-to-date banking information to bank sponsors and applicants. All credit releases will be loaded into RIBITS by the Corps. The sponsor will subsequently be required to update the credit sales as they occur to provide accurate and real-time accounting. The sponsor should enter the required fields into the system as directed by the Corps. See Appendix 9 for RIBITS fields.

The First Release of Credits: An initial debiting of a percentage of total credits projected at mitigation bank maturity can occur, provided the following conditions are satisfied: the mitigation banking instrument and mitigation plan have been approved (signed by the

sponsor, long-term manager and the IRT), the mitigation bank site has been secured, appropriate financial assurances have been established, and any other requirements determined to be necessary by the Corps have been fulfilled prior to the signing of the bank instrument (see 33 CFR 332.8(m)).

All preservation credits and up to 30% of the total anticipated credits, minus any rehabilitation credits, will be released once the conditions for an initial debiting are satisfied. Construction, including all proposed initial plantings, must be completed within one year of the initial release. In order to assure the integrity of the final bank plan, no construction activities shall commence prior to the signing of the banking instrument, which indicates the plan is approved by the IRT. If construction does occur on any part of the plan prior to signing, the instrument will not be effective, and no credits will be released, until the IRT certifies in writing that such construction is in compliance with the final bank plan.

Annual field monitoring of the bank shall commence only once all of the following criteria have been met:

1. Signature of the bank instrument by all IRT agencies,
2. One complete growing season has elapsed since the bank was constructed (including seeding and planting of woody and herbaceous plants). In cases where all plantings are not going to occur in the initial year, monitoring and credit release schedules will be adjusted accordingly.

Additional Credit Releases: Credits can be released at any time, in an amount up to the 25% final release holdback, if they are meeting all final performance goals specified in the signed instrument. If the wetland areas within a bank are developing as desired, but do not meet these final goals, the applicant may request interim credit releases according to the following schedule:

Year 3: Following the successful construction of the wetland habitat and submittal of the year 3 monitoring report, up to 15% of the total anticipated credits may be released if the following conditions are met:

- A minimum of 45% of the total projected wetland area for the entire site (the initial 30% of credits plus 15% requested credits) must meet wetland criteria.
- These same wetland areas have less than 15% relative cover of non-native invasive plant species as defined in Appendix 7. Invasive species coverage can consist of up to 10% of *Typha spp.*, and less than 10% relative cover of all other non-native invasive plant species, but not more than 15% total.
- The same wetland areas have at least 50% relative cover of native perennial hydrophytes (FAC, FAC+, FACW (+/-), and OBL).
- The same wetland areas meet 80% of the target VIBI scores.
- All forested wetland areas are developing into a successful forested ecosystem as evidenced by graphing basic forestry metrics over time. Graphs must indicate all forestry performance goals will likely be met at the end of the ten-year monitoring period.

Year 5: Assuming that all necessary requirements described above were met after year 3, up to 15% of the total anticipated credits may be requested for release if the following conditions are met:

- A minimum of 60% of the total projected wetland area for the entire site must meet wetland criteria.
- These same wetland areas have less than 12.5% relative cover of non-native invasive plant species as defined in Appendix 7. Invasive species coverage can consist of up to 10% of *Typha spp.*, and less than 7.5% of all other non-native invasive plant species, but not more than 12.5% total.
- The same wetland areas have at least 60% relative cover of native perennial hydrophytes (FAC, FAC+, FACW (+/-), and OBL).
- The same wetland areas meet 90% of the target VIBI scores.
- All forested wetland areas are developing into a successful forested ecosystem as evidenced by graphing basic forestry metrics over time. Graphs must indicate all forestry performance goals will likely be met at the end of the ten-year monitoring period.

Year 7: Assuming that all necessary requirements described above were met after year 5, up to 15% of the total anticipated credits may be requested for release if the following conditions are met:

- A minimum of 75% of the total projected wetland area- for the entire site must meet wetland criteria.
- These same wetland areas will have less than 10% total relative cover of invasive species as defined in Appendix 7. This can consist of up to 10% of *Typha spp.*, and less than 5% relative cover of all other non-native invasive plant species, but not more than 10% total.
- The same wetland areas have at least 75% relative cover of native perennial hydrophytes (FAC, FAC+, FACW (+/-), OBL).
- The same wetland areas meet target VIBI scores.
- All forested wetland areas are developing into a successful forested ecosystem as evidenced by graphing basic forestry metrics over time. Graphs must indicate all forestry performance goals will likely be met at the end of the ten-year monitoring period.

The Final Release of Credits: A minimum of 25% of the total credits at a bank site will be withheld until the final monitoring report has been submitted and evaluated by the IRT. If all performance standards have been met, and any forested wetlands present within the mitigation bank have been clearly shown to be developing into a successful forested ecosystem (i.e., trees and shrubs are alive, healthy, and present in the numbers and diversity described above), the final 25% of credits may be released. Credits will not be released until a final delineation acceptable to the Corps has been submitted and approved. The IRT will make the final recommendation regarding credit release to the Corps and Ohio EPA. Monitoring periods may be shortened if performance criteria are

met before the end of the monitoring period or extended if all performance standards have not been met. See 33 CFR 332.6(b) for further information.

Release Conditions: Release of credits requires consensus of the IRT that an additional credit release is warranted based on performance standards described above. Interim releases (3rd, 5th, and 7th years) may occur following submittal of the annual monitoring reports, if all requirements have been met to the satisfaction of the IRT. In some instances, for more rapidly developing habitat types (e.g., emergent wetland), the above credit release schedule may be accelerated if wetlands meet interim criteria ahead of schedule (e.g., year 7 criteria met at year 5). The sponsor shall arrange for on-site visits with the IRT at a minimum during years 1, 3, 5, 7 and 10. Determinations on whether credits are meeting performance standards will be decided by the IRT. When consensus cannot be reached by the IRT, credit releases will require, at a minimum, the approval of both the Corps and Ohio EPA.

SECTION 11: CREDIT CALCULATION

The IRT will be the final decision maker on all credit ratios for assigned activities. Re-establishment that has a minimum alteration of site conditions is the strongly preferred method for compensatory wetland mitigation. To ensure long-term viability of wetland resources, 50-meter minimum buffers (measured from the boundaries of existing or proposed wetlands) should be established to protect wetlands from potential threats from surrounding incompatible present or future land uses. See Section 10: Credit Release Schedule and Criteria for timing of credit releases.

Table 2. Credit ranges based on action proposed at the bank

Type	Credits	Areas > 50 m from Wetland Boundaries	Notes
Wetland Re-establishment	*Up to 1:1	N/A	Preferred
Wetland Rehabilitation	Up to 1:2	N/A	No up-front release
Wetland Establishment	Up to 1:1	N/A	Not the preferred method/up-front may be reduced
Wetland Preservation	Generally 1:10 Up to 1:4	N/A	Looking for higher quality areas & demonstrated threat
Buffer-restoration	Generally 1:4 within 50m	May be considered for 1:10	
Buffer rehabilitation	Up to 1:4 within 50m	May be considered for 1:10	
Buffer preservation	Generally 1:10	Considered if ecologically compelling reason	Looking for higher quality areas

* Re-established wetlands will typically be credited at a 1:1 ratio if these resources are protected by the concurrent establishment of a protective upland buffer of adequate quantity (at least 50 meters wide) and quality. In cases where the re-established wetlands cannot be protected with the desired buffer as described above (e.g., wetlands developed up to edge of property boundary), the credit ratio will be reduced to between 1:2 and 1:4 within the buffer area, as determined by the IRT, depending on the level of risk associated with the intensity of current and reasonably foreseeable future land uses on adjacent properties.

SECTION 12: DEFAULT PLAN

Should the IRT determine that the Sponsor is in material default of any provision of the Instrument, the IRT, acting through the Corps, may notify the Sponsor that the sale or transfer of any credits will be suspended until the appropriate deficiencies have been remedied. Upon notice of such suspension, the Sponsor agrees to immediately cease all sale or transfer of mitigation credits until the IRT informs the Sponsor in writing that sales or transfers may be resumed. Should the Sponsor remain in default, the IRT, acting through the Corps, may terminate the Mitigation Banking Instrument and any subsequent Bank operations. Upon termination, the Sponsor agrees to perform and fulfill all obligations under the instrument relating to credits that were sold or transferred prior to termination. Should a bank default, sufficient financial assurances to correct any material default may be utilized.

SECTION 13: BANK CLOSURE CRITERIA

Prior to closure of a bank or bank site, the IRT will perform a final compliance inspection to evaluate whether all performance measures have been met. Bank closure will occur upon the Corps and Ohio EPA determining, in consultation with the other members of the IRT and the Sponsor, that:

1. all applicable performance measures have been achieved;
2. all available credits for that bank or bank site have been debited;
3. the Sponsor has prepared a Long-Term Management and Maintenance Plan, that has been approved by the IRT;
4. the Sponsor has prepared and submitted to the IRT and the appropriate locality a GIS shapefile or similar exhibit depicting the location and extent of the mitigation bank;
5. the Sponsor has either: (i) assumed responsibilities for accomplishing the Long-Term Management and Maintenance Plan, in which case the Sponsor will fulfill the role of Long-Term Manager, or (ii) has assigned those responsibilities to another Long-Term Manager;
6. the Catastrophic Event and Long-Term Management Fund has been funded;
7. the contents of the Catastrophic Event and Long-Term Management Fund have been transferred to the Long-Term Manager;
8. the bank has complied with all other terms of the Instrument.

Upon bank closure, no further credit transfer may occur and the period of long-term ownership and preservation will commence. The IRT will issue a written certification of satisfaction to the Sponsor and the escrow agent and thereafter any remaining monitoring and maintenance fund will be released to the Sponsor.

APPENDIX 1 TWELVE COMPONENTS OF A COMPENSATORY MITIGATION PLAN

Mitigation banks and in-lieu fee programs must prepare a mitigation plan including the 12 components listed below for each mitigation project site.

12 Components of a Compensatory Mitigation Plan (listed in 33 CFR 332.4 (c)(2) through (14))

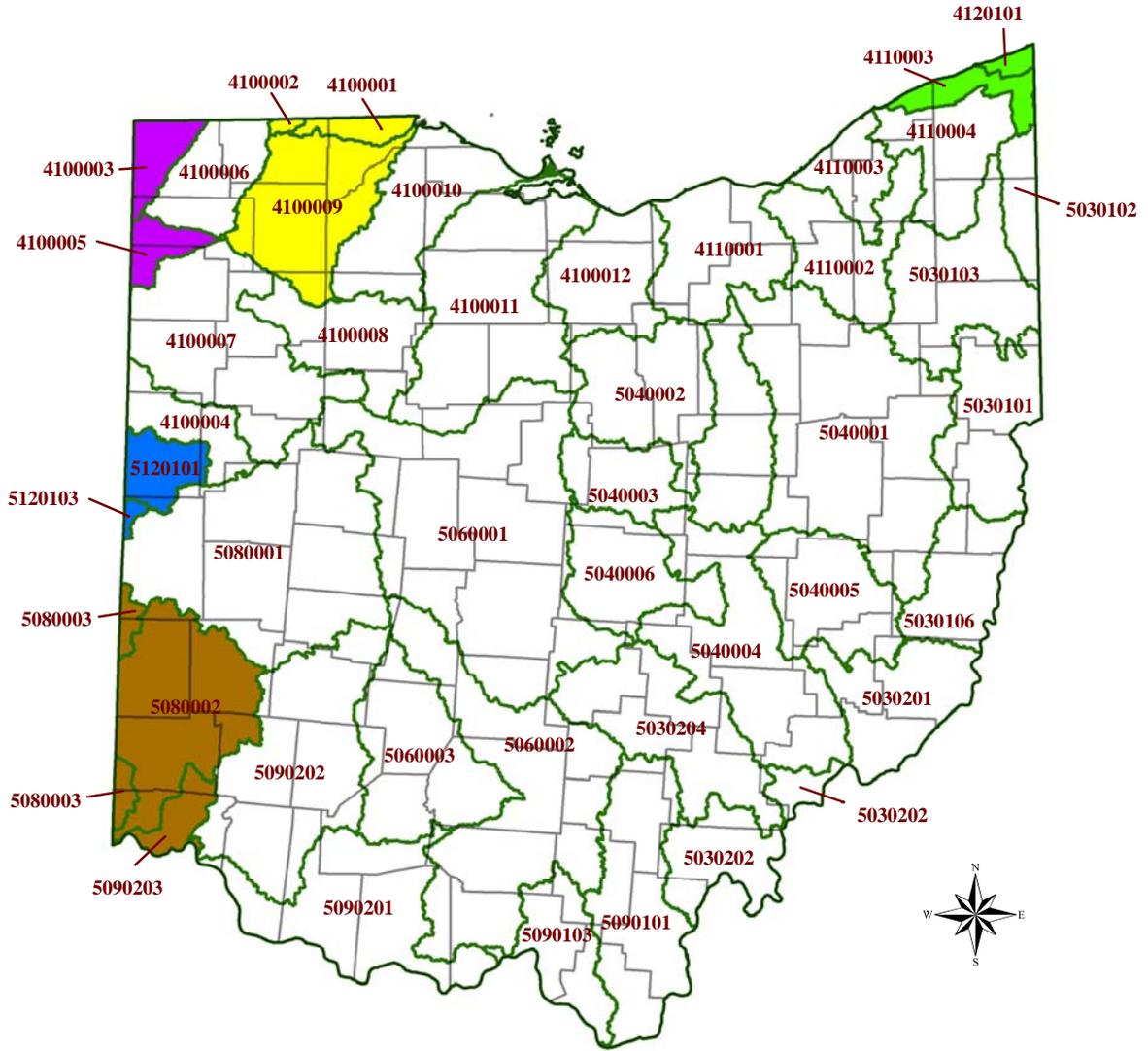
1. **Objectives.** A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.
2. **Site selection.** A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.
3. **Site protection instrument.** A description of the legal arrangements and instrument, including site ownership, which will be used to ensure the long-term protection of the mitigation project site.
4. **Baseline information.** A description of the ecological characteristics of the proposed mitigation project site (and in the case of an associated application for a DA permit, the impact site). This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site.
5. **Determination of credits.** A description of the number of credits to be generated including a brief explanation of the rationale for this determination.
6. **Mitigation work plan.** Detailed written specifications and work descriptions for the mitigation project at the bank, including: the geographic boundaries of the project at the bank site; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures.
7. **Maintenance plan.** A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance standards. Ecologically-based specific and measurable standards that will be used to determine whether the project is achieving its objectives.
9. Monitoring requirements. A description of parameters monitored to determine whether the bank is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the Corps must be included. The monitoring plan should include a site plan which shows where all hydrological monitoring wells and plant sampling locations will be established.
10. Long-term management plan. A description of how the bank will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.
11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the project, including the party or parties responsible for implementing adaptive management measures.
12. Financial assurances. A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the mitigation project at the bank will be successfully completed, in accordance with its performance standards.

Other information. The Corps may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation bank.

APPENDIX 2 MAP OF 8 DIGIT HUCs

Watersheds for Ohio Wetland Water Quality Standards

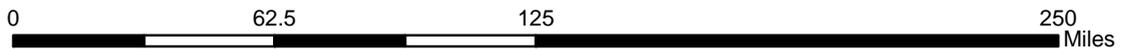


Wetland Water Quality Standard Watersheds comprised of a single USGS 8-digit Hydrologic Unit

- 04100004; 04100006; 04100007; 04100008; 04100010; 04100011; 04100012; 04110001; 04110002; 04110003 (Chagrin river watershed only); 04110004; 05030101; 05030102; 05030103; 05030106; 05030201; 05030202; 05030204; 05040001; 05040002; 05040003; 05040004; 05040005; 05040006; 05060001; 05060002; 05060003; 05080001; 05090101; 05090103; 05090201; and 05090202

Wetland Water Quality Standard Watersheds comprised of more than one USGS 8-digit Hydrologic Unit

- 04100001, 04100002, 04100009
- 04100003, 04100005
- 0411003 (minus the Chagrin River watershed), 04120101
- 05080002, 05080003, 05090203
- 05120101, 05120103



APPENDIX 3 DRAFT MITIGATION BANK PROSPECTUS CHECKLIST

Please provide the following information and checklist with the submittal of a Draft Prospectus (see 33 CFR 332.8(d)(3) for additional information):

- A. Proposed Bank Name - Use a short name based on a geographic feature if possible; include “Mitigation Bank” in the name
- B. Bank contacts – include the name, address, phone, fax, email, and role in project for at least one contact: the contact may be the Bank Sponsor, Land Owner, Consultant, etc
- C. General location map and address of the proposed bank property
- D. Accurate current map of the proposed bank property on a 7.5 minute USGS map showing boundaries of the site
- E. Aerial photo of the bank site and surrounding properties
- F. Soils map of the bank site and surrounding properties
- G. Map of the proposed bank service area
- H. Current site conditions description including
 - potential wildlife habitats and species known or potentially present
 - photos of the site
 - description of potential wetlands and waters present on site
 - hydrology description
 - approximate acreage of existing wetlands and waters to be restored
 - site history including past land uses
 - surrounding land uses and zoning
 - anticipated future development in the area
 - mineral rights (above & below ground)
- I. Conceptual site plan

APPENDIX 4 MITIGATION BANK PROSPECTUS CHECKLIST

Please provide the following information and checklist with the submittal of a Prospectus (see 33 CFR 332.8(d)(2) for additional information):

- A. Proposed Bank Name - Use a short name based on a geographic feature if possible; include “Mitigation Bank” in the name
- B. Bank contacts – Include the name, address, phone, fax, email, and role in project for: Bank Sponsor, Land Owner if different, Consultants, etc
- C. The qualifications of the sponsor to successfully complete the type(s) of mitigation project(s) proposed, including information describing any past such activities by the sponsor
- D. General location map and address of the proposed bank property
- E. Accurate current map of the proposed bank property on a 7.5 minute USGS map showing boundaries of the bank site *
- F. Aerial photo of the site and surrounding properties
- G. Map of the proposed bank service area *
- H. Objectives of the proposed mitigation bank
- I. How the mitigation bank will be established and operated
- J. The general need for and technical feasibility of the proposed mitigation bank
- K. The proposed ownership arrangements and long-term management strategy for the mitigation bank site
- L. Site conditions description. This must describe the ecological suitability of the site to achieve the objectives of the proposed mitigation bank, including the physical, chemical, and biological characteristics of the bank site and how that site will support the planned types of aquatic resources and functions and should include: site conditions and habitats, photos of the site, description of wetlands and waters present on site, hydrology description, number of acres of existing wetlands and waters and what is proposed for re-establishment, rehabilitation, etc., site history including past land uses, surrounding land uses and zoning along with the anticipated future development in the area
- M. Assurance of sufficient water rights to support the long-term sustainability of the mitigation bank
- N. Proposed number and kind of credits (and acres) on the property

- O. Proposed credit release schedule
- P. Delineation of all on-site aquatic resources
- Q. Preliminary plans *
- R. Preliminary title report indicating any easements or other encumbrances. Note, any liens and easements on the property that may affect a bank's viability will need to be resolved before a bank can be approved. Provide a written assessment of all easements and encumbrances describing the easement and how it may affect bank operation or habitat values
- S. Any other restrictions on the property

* For the purposes of the Public Notice, all figures must be legible, black and white, and submitted on 8.5 x 11-inch paper.

APPENDIX 5 DRAFT AND FINAL MITIGATION BANK INSTRUMENT CHECKLIST

Please provide the following information and checklist with the submittal of a Bank Instrument (see 33 CFR 332.8(d)(6) and (8) and 332.4(c)(2) – (14) for additional information):

- Table of Contents
- Introduction including
 - Mitigation bank name
 - Mitigation bank sponsor and other contact information
 - Mitigation bank location
- Mitigation bank objectives
- Site selection factors considered
- Proposed service area
- Sponsor’s legal responsibility for providing mitigation
- Site Conditions including
 - Ownership
 - Relationship to other programs
 - Soils
 - Hydrology
 - Existing vegetation
 - Existing aquatic resources
 - Unique features
 - Hazardous substances
 - Adjacent land use
 - Watershed plan (if any)
- Mitigation work plan – detailed written specifications and work descriptions for the site
- Determination of number and types of credits
- Site protection instrument
- Financial assurances including
 - Construction
 - Monitoring and maintenance
 - Long-term management
- Performance standards – ecologically based standards used to determine whether the project is achieving its objectives

- Monitoring and reporting plan
- Credit release schedule and criteria tied to specific milestones
- Accounting procedures
- Maintenance plan – description and schedule of maintenance requirements
- Adaptive management plan – a management strategy to address unforeseen changes in site conditions or other aspects of the project
- Long-term management plan – description of mitigation site management after meeting all performance standards to ensure long-term sustainability of the site
- Default provisions
- Bank closure plan
- Definitions
- Signature page
- Service Area Map
- Mitigation Plan (with 12 required components)
- Credit Ledger

APPENDIX 6 MITIGATION BANK INSTRUMENT FORMAT

The body of the Instrument is intended to provide concise narrative details and descriptions of each component of the Instrument. Full details and plans should be included as appendices in the following format:

Table of Contents

Introduction

- A. Mitigation Bank Name
- B. Sponsor
- C. Location
- D. Legal Authorities

Section I: Mitigation Bank Overview

- A. Mitigation Bank Objectives
- B. Site Selection Factors Considered
- C. Proposed Service Area
- D. Legal Responsibility for Providing Mitigation
- E. Site Conditions
 - 1. Ownership
 - 2. Relationship to Other Programs
 - 3. Soils
 - 4. Hydrology
 - 5. Existing Vegetation
 - 6. Existing Aquatic Resources
 - 7. Unique Features
 - 8. Hazardous Substances
 - 9. Adjacent Land Use
 - 10. Watershed Plan (if any)

Section II: Mitigation Bank Establishment

- A. Mitigation Work Plan/Bank Development Plan
- B. Enforceability
- C. Determination of Number and Types of Credits
- D. Site Protection

Section III: Mitigation Bank Operation

- A. Financial Assurances
 - 1. Construction
 - 2. Monitoring and Maintenance
 - 3. Long-term Management
- B. Performance Standards
- C. Monitoring and Reporting Plan
- D. Credit Release Schedule and Criteria
- E. Accounting Procedures
- F. Maintenance Plan
- G. Adaptive Management Plan

- H. Long-term Management Plan
- I. Default Provisions
- J. Bank Closure Plan

Section IV: Definitions

Signature Page

Appendices:

- A. Service Area Map
- B. Mitigation Plan
 - 1. Objectives
 - 2. Site Selection
 - 3. Site Protection Instrument
 - 4. Baseline Information (including a delineation of waters of the United States)
 - 5. Determination of Credits
 - 6. Mitigation Work Plan
 - 7. Maintenance Plan
 - 8. Performance Standards
 - 9. Monitoring Requirements
 - 10. Long-term Management Plan
 - 11. Adaptive Management Plan
 - 12. Financial Assurances
- C. Credit Ledger

APPENDIX 7 INVASIVE PLANT LIST FOR OHIO MITIGATION

Scientific Name	Common Name
<i>Acer platanoides</i>	Norway Maple
<i>Ailanthus altissima</i>	Tree-of-Heaven
<i>Alliaria petiolata</i>	Garlic Mustard
<i>Alnus glutinosa</i>	European Alder
<i>Berberis thunbergii</i>	Japanese Barberry
<i>Butomus umbellatus</i>	Flowering-rush
<i>Catalpa speciosa</i>	Northern Catalpa
<i>Celastrus orbiculatus</i>	Asian Bittersweet
<i>Cirsium arvense</i>	Canada Thistle
<i>Conium maculatum</i>	Poison Hemlock
<i>Coronilla varia</i>	Crown Vetch
<i>Dipsacus fullonum</i>	Common Teasel
<i>Dipsacus laciniatus</i>	Cut-leaved Teasel
<i>Elaeagnus angustifolia</i>	Russian Olive
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Epilobium hirsutum</i>	Hairy Willow-herb
<i>Epilobium parviflorum</i>	Small-flowered Willow-herb
<i>Euonymus alatus</i>	Winged Euonymus
<i>Euonymus fortunei</i>	Wintercreeper
<i>Hydrocharis morsus-ranae</i>	Common Frog-bit
<i>Iris pseudacorus</i>	Yellow Flag
<i>Ligustrum vulgare</i>	Common Privet
<i>Lonicera japonica</i>	Japanese Honeysuckle
<i>Lonicera maackii</i>	Amur Honeysuckle
<i>Lonicera morrowii</i>	Morrow Honeysuckle
<i>Lonicera tartarica</i>	Tartarian Honeysuckle
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Maclura pomifera</i>	Osage Orange
<i>Microstegium vimineum</i>	Japanese Stilt Grass
<i>Myriophyllum spicatum</i>	Eurasian Water-milfoil
<i>Najas minor</i>	Lesser Naiad
<i>Nasturtium officinale</i>	Watercress
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phragmites australis</i>	Common Reed
<i>Polygonum cuspidatum</i>	Japanese Knotweed
<i>Potamogeton crispus</i>	Curly Pondweed
<i>Pyrus calleryana</i>	Bradford Pear
<i>Ranunculus ficaria</i>	Lesser Celandine
<i>Rhamnus cathartica</i>	Common Buckthorn
<i>Rhamnus frangula</i>	Glossy Buckthorn
<i>Rosa multiflora</i>	Multiflora Rose
<i>Schoenoplectus mucronatus</i>	Bog Bulrush
<i>Sorghum halepense</i>	Johnson Grass
<i>Typha angustifolia</i>	Narrow-Leaved Cattail
<i>Typha x glauca</i>	Hybrid Cattail
<i>Viburnum opulus var. opulus</i>	European Cranberry-Bush
<i>Vinca minor</i>	Periwinkle

APPENDIX 8 EXAMPLE VIBI ANALYSIS FOR A MITIGATION BANK USING DATA COLLECTED FROM FIXED AND RANDOM PLOTS

In this example, the bank is bisected by a railroad track which represents a hydrologic break in the site. Surrounding the aquatic resources located within each half of the bank is an upland buffer measuring 50 to 100 meters in width. This buffer has been planted with a diversity of woody species adapted to drier conditions. On the east side of the tracks, two different plant communities have been targeted (forested and emergent), while the west side has three different wetland plant communities (emergent, scrub-shrub, and forested). Since the site was kept in row crops until the mitigation bank was established, an emergent VIBI target score has been set as a performance goal for each of these wetland areas. As the bank is located in the Erie Ontario Lake Plains Ecoregion, the VIBI target is 61. Other final performance goals are as follows:

- > 75% native perennial hydrophytes
- < 5% non-*Typha* invasive species

In order to qualify for the year 3 interim credit release, at least 45% of the site must meet the year 3 interim goals, including no more than 15% invasive species coverage, no less than 50% coverage of native perennial hydrophytes, and 80% of the final VIBI target score ($61 \times 0.8 = 49$). Figure A-9.1 provides a simple site layout, indicating the various wetland sub-areas, along with the location of random VIBI modules scattered throughout the bank site. As can be seen on the map, an area of reed canary grass (*Phalaris arundinacea*) was identified on the west side of the bank, and was mapped using GPS technology. Identifying and mapping the area, even though none of the random VIBI modules fall within its boundary, will allow the sponsor to eradicate this patch and re-plant with native hydrophytes before the problem becomes much worse. It also provides data that would not have been reported otherwise and ensures that areas clearly dominated by invasive species are not released as credits until the problem is addressed.

Table A-8.1 shows the data analysis for the bank. As can be seen from this analysis, wetland areas east of the railroad are not meeting all interim performance goals. These areas represent about 39% of the bank. The sponsor should determine what remedial measures are necessary to improve conditions for this side of the bank. On the west side, the *Phalaris* patch is 1.95 acres in size, which represents 3.24% of the wetland area within the bank. This patch is also not meeting interim goals and will be addressed with the appropriate eradication methods. The remaining emergent, scrub-shrub, and forested wetland areas on this half of the bank are all meeting each of the interim performance goals. As these areas represent 57.3% of the wetland areas located in this bank, conditions have been met and the sponsor is eligible for the additional Year 3 interim credit release of 15%.

Figure A-8.1. Example mitigation bank map, indicating different wetland cells and plant community types. Random 10M x 10M VIBI modules are displayed as red squares, and 20M x 50M “fixed” VIBI plots are shown in blue.

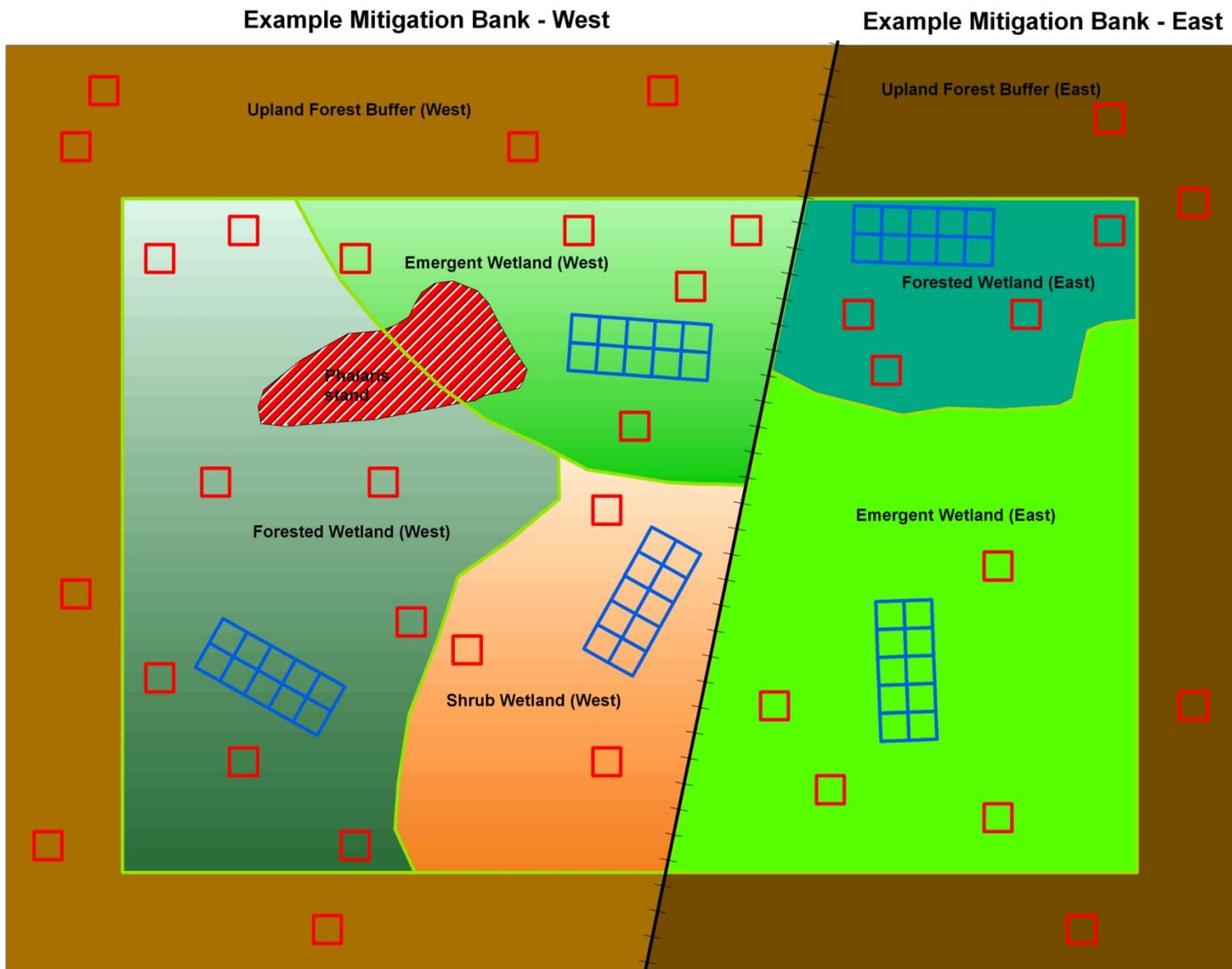


Table A-8.1. Year 3 VIBI data for fixed plots and random plots, aggregated by bank area and plant community.

Bank Sub-Area	Area (Acres)	% of Wetlands in Bank	Random VIBI Modules	VIBI Score	% Native Perennial Hydrophytes	% All Invasives	% <i>Typha</i> spp	Meeting All Year 3 Interim Goals?
East – Emergent (Random)	17.82	29.57	4	31	54.90	5.10	2.01	No
East - Emergent (Fixed)	17.82*	29.57*	NA	32	65.30	14.31	12.5	No
East – Forest (Random)	5.96	9.89	4	27	22.80	37.90	0.00	No
East – Forest (Fixed)	5.96*	9.89*	NA	23	15.7	55.35	0.00	No
Forest Buffer – East (Random)	17.17	0.00	4	NA	NA	3.90	0.00	NA
Forest Buffer – West (Random)	23.56	0.00	7	NA	NA	10.70	0.00	NA
<i>Phalaris</i> Stand	1.95	3.24	0	NA	NA	100.00	0.00	No
West – Emergent (Random)	8.19	13.59	5	55	57.40	14.80	9.18	Yes
West – Emergent (Fixed)	8.19*	13.59*	NA	61	69.10	12.75	3.50	Yes
West – Forest (Random)	17.12	28.41	8	58	73.00	7.90	0.00	Yes
West – Forest (Fixed)	17.12*	28.41*	NA	53	85.60	5.45	0.00	Yes
West – Shrub (Random)	9.22	15.30	3	61	62.90	2.10	1.45	Yes
West – Shrub (Fixed)	9.22*	15.30*	NA	70	55.70	13.85	9.77	Yes

*Fixed plot data should be used to verify results for random plots when they are located in the same sub-area.

APPENDIX 9 REGULATORY IN-LIEU FEE AND BANK INFORMATION TRACKING SYSTEM (RIBITS)

Credit Ledger for: Jones Mitigation Bank

TW = Total Withdrawal Credits, BoR = Balance of Released Credits, Rel = Release, Wdr = Withdrawal

Type	Jurisdiction	Date	Permittee	Credits	Permits	Credit Classification	Impact HUC	Impact Quantity	TW	BoR	Comment
Rel	Federal	9/20/2007		25.5		Forested			0	25.5	
Rel	Federal	9/20/2007		15		Non-forested			0	15	
Wdr	Federal	1/22/2008	Acme Buildings	2	2007-00701, 052324	Forested		2	2	23.5	
Wdr	Federal	5/1/2009	Bob Smith	0.7	2008-00385	Non-forested		0.35	0.7	14.3	
Wdr	Federal	5/25/2009	Sam Adams	1.5	2009-00111	Non-forested		1	2.2	12.8	

APPENDIX 10 REFERENCES

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experimental Station.

Federal Register. April 10, 2008. Part II Department of Defense, Department of the Army, Corps of Engineers, 33 CFR Parts 325 and 332, Environmental Protection Agency, 40 CFR Part 230: Compensatory Mitigation Losses of Aquatic Resources; Final Rule.

Houlihan, J. E., P. A. Keddy, K. Makkay, and C.S. Findlay. 2006. The Effects of Adjacent Land Use in Wetland Species Richness and Community Composition. *Wetlands* 26(1): 79-96.

Mack, John J., M. Siobhan Fennessy, Mick Micacchion and Deni Porej. 2004. Integrated Wetland Assessment. Part 6: Standardized Monitoring Protocols and Performance Standards for Wetland Creation, Enhancement and Restoration, Version 1.0. Ohio EPA Technical Report WET/2004-6. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio.

Mack, John J. 2007. Integrated Wetland Assessment Program. Part 9: Field Manual for the Vegetation Index of Biotic Integrity for Wetlands v. 1.4. Ohio EPA Technical Report WET/2004-9. Ohio Environmental Protection Agency, Wetland Ecology Group, Division of Surface Water, Columbus, Ohio.

Mayer, P. M., S. K. Reynolds, Jr., T. J. Canfield, and M.D. McCutchen. 2005. Riparian Buffer Width, Vegetative Cover, and Nitrogen Removal Effectiveness: A Review of Current Science and Regulations. National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio. 27 pp.

Reed, P.B., Jr. 1988. National List of Plant Species that Occur in Wetlands: 1988 National Summary. Biological Report 88(24). Washington, DC: U.S. Fish and Wildlife Service. 111pp.

Semlitch, R. D. and J. R. Bodie. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. *Conservation Biology* 17(5): 1219-1228.

Slawski, T. 2010. Managing the Water's Edge: Making Natural Connections. Southeastern Wisconsin Regional Planning Commission. 24 pp.

Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent, and Vegetation. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, Georgia. 59 p.

Woods, A.J., J.M. Omernik, C.S. Brockman, T.D. Gerber, W.D. Hosteter, and S.H. Azevedo. 1998. Ecoregions of Indiana and Ohio [2 sided color poster with map, descriptive text, summary tables, and photographs]. U.S. Geological Survey, Reston, VA. Scale 1:500,000).