NATIONAL WETLAND MITIGATION BANKING STUDY
Technical and Procedural Support to Mitigation Banking Guidance

Institute for Water Resources
Water Resources Support Center
U.S. Army Corps of Engineers
Alexandria, Virginia 22315

December 1995 **IWR Technical Paper WMB-TP-2**

ACKNOWLEDGMENTS

This mitigation banking document instrument was prepared as part of the U.S. Army Corps of Engineers (Corps) Institute for Water Resources (IWR) National Wetland Mitigation Banking Study (NWMBS) and in support to the Council of Environmental Quality Interagency Wetlands Working Group for Federal Wetlands Policy in the development of Federal Mitigation Banking Guidance.

The NWMBS is being conducted within the IWR Policy and Special Studies Division, whose Chief is Eugene Stakhiv. The study manager is Robert Brumbaugh.

The document was prepared under the direction of Robert Brumbaugh. Fari Tabatabai (Corps, Los Angeles District, on developmental assignment to IWR) and Robert Brumbaugh prepared this draft of the document building upon earlier efforts of Richard Reppert (IWR) and the late Julie Metz (Corps, Baltimore District, on developmental assignment to IWR). Those drafts incorporated material developed by Jean O'Neil (WES). Earlier drafts of this document benefitted from the substantial and invaluable comments from Tom Kelsch (U.S. Environmental Protection Agency Wetlands Division) and Jack Chowning (Corps Headquarters Regulatory Branch), co-chairs of the interagency staff-level mitigation banking working group that prepared the Federal Mitigation Banking Guidance (issued in the Federal Register on 28 November 1995), Mike Long and Mark Miller (U.S. Fish and Wildlife Service), Susan-Marie Stedman (National Marine Fisheries Service) , and Laura Mazanti and Sandra Byrd (Natural Resources Conservation Service). However, this document has not been specifically endorsed by the respective agencies referenced above.

TECHNICAL AND PROCEDURAL
SUPPORT TO MITIGATION BANKING GUIDANCE

TABLE OF CONTENTS

INTRODUCTION

This document elaborates on certain policy considerations which were presented in the Federal Mitigation Banking Guidance. This support to the guidance is limited in scope to wetland systems; although Section 404 of the Clean Water Act extends the applicability of mitigation banking to wetlands and other aquatic environments, it is recognized that its principle role will be to compensate for unavoidable wetland losses. Accordingly, this document recognizes this programmatic emphasis.

This support to the Mitigation Banking Guidance is written in a general vein which provides latitude for adaptation to local situations. The provisions of more explicit technical and procedural guidance is the responsibility of the authorizing agencies (i.e., the Corps or NRCS) and the Mitigation Bank Review Team (MBRT) in the development of specific banking instrument.

CHAPTER ONE
BANK PLANNING

Establishment, operation, and maintenance of a mitigation bank entails a set of procedures involving a mitigation bank sponsor, regulatory authority(ies), and other pertinent agencies. This section provides an overview of the mitigation banking process that involves planning and design, implementation, and operation of the bank.

1. Overview of Planning, Implementation, Review and Approval Procedures

Detailed guidance on various phases of the mitigation bank establishment is provided in various appendices of this document. Table 1 contains detailed chronological listing of activities involved in banking from a bank's initial inception through its implementation and operation. The table identifies those activities which are the primary responsibility of the sponsor and those which are part of the review and approval role served by the Corps or NRCS and the MBRT.

2. Initiation of Bank Planning

A. Prospective bank sponsors should make initial contact with the U.S. Army Corps of Engineers (Corps) or the Natural Resources Conservation Service (NRCS), at the field operating level. If the purpose of a proposed bank is to compensate for wetland losses caused by activities which are regulated under Section 10 of the Rivers and Harbors Act of 1899 or Section 404 of the Clean Water Act, initial contact should be with the Corps district which has regulatory jurisdiction in the area in question. If the bank's purpose is to compensate for wetland losses due to agricultural conversions covered under the Food Security Act of 1985, initial contact should be with the appropriate NRCS district.

While the specific bank planning and design process can begin with the sponsor’s determination of the need and opportunity for a mitigation bank, in certain cases, the Corps or NRCS and the prospective MBRT should consider a proactive approach, even before the prospective bankers approach them. If the agencies expect mitigation banking would be a useful tool for providing effective compensatory mitigation in specific areas, such as those with a potential for high permit demands for compensatory mitigation, the agencies should consider meeting to talk about trends in Section 10/404 permitting, local and regional economic trends and projects, land use and zoning plans, local watershed restoration objectives, and potential mitigation bank sites.

B. Should the geographic area encompassed by a proposed bank and its associated debit areas overlap two or more Corps or NRCS districts, those agencies should determine which district should take the lead in bank planning and implementation.

C. The Corps or NRCS at this initial stage convenes an informal meeting with the bank sponsor and potential participants on a Mitigation Bank Review Team (MBRT). Such a meeting would provide the sponsor an opportunity to describe bank plans in conceptual terms and to obtain advice from the agencies on preparation of a formal prospectus should the sponsor proceed with the concept.

D. The sponsor should identify the bank's goals and operational objectives and outline credit production methods in sufficient detail to allow a preliminary assessment of its technical feasibility. The sponsor submits a detailed formal prospectus. After submission of the prospectus to the Corps or NRCS, these agencies would formalize development of a MBRT for the proposed bank.

Table 1
Bank Planning, Implementation and Operational Procedures

Banking Activities (shown in a typical order of occurrence)	Responsible entity		
	Sponsor	Corps or NRCS	MBRT
Planning and Design			
Determine need and opportunity for banking, establish bank objectives, identify potential bank users or clients, identify physical resources and methods for producing compensatory credits.	X		
Discuss bank in conceptual terms with Corps or NRCS, as appropriate, and potential MBRT member agencies.	X	X	X
Prepare formal banking prospectus.	X		
Formalize MBRT.		X	
Review prospectus, conduct site inspection as necessary, evaluate proposed bank's purpose and objectives and assess its technical feasibility.		X	X
Determine if Section 10/404 permit is required for initial bank development.		X	
Apply for Section 10/404 permit as required.	X		
Develop interagency agreement to serve as the formal banking instrument.	X	X	X
Conduct detailed planning, including baseline characterization of bank site.	X		
Submit detailed plans to Corps or NRCS, as appropriate, for distribution to MBRT.	X		
Review and approve detailed bank plans.		X	X
Determine appropriateness and extent of wetland preservation credits.		X *	X
Review permit application and issue appropriate type of permit. **Note:** if bank is to operate as an adjunct to a General Permit, it may also be appropriate to issue said permit in this time frame.		X	
Finalize and sign banking instrument	x	x	x
Implementation			
Demonstrate real estate interests and proof of financial assurance as required.	X		
Approve availability of advance/preservation credits as applicable.		X	
Authorize debiting of preservation credits as applicable.		X *	
Initiate wetland restoration, enhancement and creation credit production activities.	X		
Submit completion report describing "as-built" conditions to Corps or NRCS for distribution to MBRT.	X		
Review completion report and conduct site inspection.		X	X
Operation			
Determine number of restoration, enhancement, and creation credits.		X	
Authorize debiting of restoration, enhancement, and creation credits for compensation purposes.		X	
Operate and maintain bank in accordance with terms of formal banking instrument, including periodic assessment of bank success.	X		
Monitor bank success, identify bank deficiencies, if any, update credit balance as appropriate.		X	X
Take corrective action as required.	X		

* Preservation is not recognized as a credit production method in banks developed under the "Swampbuster" provisions of the Food Security Act.

3. Planning and Design

A. Prospectus. The bank prospectus should be sufficiently detailed to allow the MBRT to assess the technical feasibility of the bank development plan and to approve its operational objectives. Information provided in the prospectus should be capable of direct incorporation into the banking instrument. The prospectus should include information of an administrative, technical and operational nature, as follows:

1. Administrative:
   - **!** Identity of the sponsor and manager.
   - **!** Classification and description of bank (e.g., whether single client, general use; identity of potential users, etc.).
   - **!** Nature of real estate interests.

2. Technical:
   - **!** Location and size of bank.
   - **!** Technical classification and condition of existing bank lands, wetlands and other aquatic habitats (baseline conditions).
   - **!** Location, classification, functions, and condition of potential debiting wetlands to the extent they can be identified.
   - **!** Proposed methods to be used, together with the description of any physical improvements to be made, for the production and maintenance of compensatory credits.
   - **!** Proposed methods and procedures to be used to determine the number of credits and debits.

3. Operational:
   - **!** Operational objectives, including delineation of bank's proposed service area and specification of the functions and wetland class and habitat types to be produced for credits.
   - **!** Proposed monitoring and contingency plans.

The prospectus should be submitted to the Corps or NRCS, and through these agencies to other member agencies of the MBRT. The prospectus should be supplemented with verbal briefings by the bank sponsor, following which the MBRT should subject it to critical review in conjunction with site inspections as required.

Following review of the prospectus, the Corps or NRCS, on behalf of the MBRT, should respond to the sponsor indicating the proposed bank's technical feasibility or infeasibility. Approval of the prospectus should be a "green light" to proceed with development of the banking instrument and detailed bank planning. Review and approval of the prospectus may be an iterative process involving successive revisions by the sponsor.

Technical feasibility, however, should not be interpreted by a bank sponsor as an indication that the MBRT considers the proposed bank to be economically viable, that it guarantees the issuance of subsequent Section 10/404 permits, or otherwise guarantees authorization for bank debiting. Such decisions should be based on their merits during actual bank operation. Following a determination of technical feasibility, the bank sponsor's next step should be to formally request the Corps or NRCS and the MBRT to facilitate development of the banking instrument preparatory to undertaking detailed bank planning.

B. Development of the Banking Instrument. The banking instrument is an interagency agreement to which the bank sponsor, regulatory and resource agencies, including the Corps and/or NRCS, other Federal, state and local agencies are signatories. All banks are required to have such an agreement.

An interagency agreement can be a stand-alone document and the sole guide for the planning, implementation and operation of a bank, or in the case of a bank which requires a Section 10/404 permit for initial development or is part of a mitigation plan developed under FSA, the interagency agreement will be made

part of and function in concert with the permit or plan. When inconsistencies exist between the interagency agreement and the permit or plan, the latter will take precedence.

Preparation of the banking instrument should begin immediately following approval of the banking prospectus. The primary responsibility for its preparation rests with the sponsor, based on advice and guidance provided by the MBRT. Agreement with the terms and contents of the interagency agreement by these entities will be indicated by their signatory approval.

The banking enabling instrument will detail the physical, legal and administrative characteristics of the bank, and establish guidelines under which the bank will be developed, implemented and operated. Administrative and operational provisions of the interagency banking agreement must be clear and enforceable. For example, all of the responsibilities of the sponsor, including establishment, maintenance, monitoring, and operation of the bank, timing of credit withdrawal, financial assurances, must be clearly identified and stated in a legally-binding manner. Detailed bank establishment plans, crediting and debiting methodology may be incorporated into the interagency agreement as appendices. Table 2 contains the basic outline of a banking instrument.

C. Goal Setting and Site Selection

1. The goal of a mitigation bank should be the establishment of a self-sustaining ecosystem which replaces the functions and acreage of wetlands anticipated to be affected within a particular watershed or other appropriate area (service area). The bank goal should be consistent with an area's identified needs for compensatory mitigation credits and physical opportunities (i.e., available natural resources) with which to supply such credits. These factors are important considerations in site selection and the establishment of bank operational objectives. Prospective bank sponsors are encouraged to establish bank goals and to strategically site banks based on the analysis of such needs and opportunities.

2. Some recommended sources of information for the analysis of compensatory needs within the area in question are:

- Trends in Section 10/404 permitting.
- Trends in agricultural conversion.
- Local and regional economic trends and projections.
- Official land use and zoning plans.

3. Opportunities for development of compensatory mitigation credits are governed by the current and projected condition of wetlands in the area under consideration and the potential which exists for their restoration, enhancement, creation and preservation. Some recommended sources of information on local and regional natural resource conditions are:

- U.S. Fish and Wildlife Service National Wetland Inventory maps of wetlands and deep water environments.
- State natural resource surveys and management plans.
- Consultation with technical experts in wetland systems.
- Watershed management plans.

Table 2
Basic Outline of Banking Instrument

COVER PAGE

- Title of document and official name of bank.

I. PREAMBLE

- Purpose of bank and its relationship to Corps or NRCS regulatory programs.
- Location and size of bank and ownership..
- Project description: mitigation bank goals and objectives.
- Size and class of wetlands and/other aquatic resources proposed for inclusion.
- Baseline conditions.
- Establishment and use of credits--type of bank (e.g. single client, general use, joint-project proprietary); identity of sponsor.
- Makeup, role, and responsibility of the MBRT. Disclaimer
- List of exhibits, including all appropriate supporting technical plans and documents.

II. AUTHORITIES

- List of authorities.

III. ESTABLISHMENT OF THE BANK

- Mitigation Plan (brief description of baseline conditions and the work to be done).
- Performance Criteria
- Implementation timetable.
- Financial assurances to be secured by the sponsor.
- Type of real estate interest to be secured by the sponsor.
- Provisions covering use of the land (incompatible activities), transfer of ownership of bank lands and/or easements.

IV. OPERATION OF THE BANK

- Service area.
- Provisions for site audits by MBRT
- Types of projects or activities that may use the bank.
- Assessment methodology (crediting and debiting procedure).
- Success criteria.
- Provisions for sale and transfer of credits (determination of credit availability, timing of credit withdrawal and factors to be considered in determining compensation ratios)
- Procedures for release of financial assurance.
- Provisions for uses of mitigation bank area.

V. MAINTENANCE AND MONITORING OF THE BANK

- Type and level of maintenance provisions.
- Monitoring provisions.
- Record keeping and monitoring requirements (schedules and techniques, reporting requirements).
- Accounting procedures.
- Contingency actions in event of partial or total bank failure.
- Long-term management responsibilities.

VI. RESPONSIBILITIES OF THE MBRT

- MBRT responsibilities for oversight, review, and compliance inspections, as necessary.

VII. OTHER PROVISIONS

- Force majeure clause (identification of catastrophic events beyond sponsor's control).
- Dispute resolution.
- Provisions pertaining to validity or effective date, modification, and termination of the Banking Instrument.
- Controlling language.

VIII. DEFINITION OF TERMS (optional)

IX. SIGNATURE PAGE

4. Statewide wetland planning has greatly increased in recent years, largely under the impetus of various Federal grant-in-aid programs. Among these are the Land and Water Conservation Fund Act which was amended by the Emergency Wetland Resources Act of 1986 to include wetland planning and action programs within its purview, and EPA planning grants for the development of state wetland protection programs. Official state wetland and aquatic resource management plans or state/local regional watershed management plans would be another basis for bank siting and the development of a mitigation bank goals. Other examples of plans of regional or local scope are approved Coastal Zone Management Plans (including Special Area Management Plans -- SAMPs) and wetland priorities established through the advanced identification of disposal sites (ADIDs) provided for in the EPA Section 404(b)(1) Guidelines. However, a local or regional plan need not have been developed under Federal auspices, so long as it has been officially adopted, is reasonably comprehensive, and clearly articulates management priorities for wetlands which can be translated into mitigation goals. An example of a plan of national scope is the North American Waterfowl Management Plan which places a high priority on the conservation and development of wetlands as breeding, wintering and resting habitat for migratory waterfowl within specified geographic areas.

In the absence of formally approved plans, the prospective bank sponsor should base siting decisions and operational goals on the best available information. Sponsors are encouraged to work with persons in academia and government (including the Corps, NRCS and other member agencies of the MBRT) who have scientific expertise in the wetland and aquatic systems involved and to retain the services of private consultants with experience in wetlands management and banking. Examples of factors which may be considered in site selection and goal setting are:

- Opportunity to develop or enhance specific wetland functions in critical areas through the strategic restoration, creation or enhancement of wetlands (e.g. improving water quality by the action of fringe or riparian wetlands; providing flood control by intercepting runoff; enhancing groundwater recharge and augmenting in-stream flows; diversifying general wildlife habitat patterns; providing nesting, resting and feeding habitat for waterfowl and wading birds).

- Opportunity to synergistically enhance the value of existing wetland and non-wetland areas (e.g. existing public or private park and recreational areas, wildlife management areas, etc.) through proximal location.

- Opportunity to improve land use patterns within a watershed or other designated area (e.g. providing open space and environmental corridors; providing areas for recreation and scientific study; providing buffers between and among residential, commercial and industrial developments).

D. Establishment of Operational Objectives

1. A bank's operational objectives should be established at the prospectus stage. The operational objectives may be modified or refined by the MBRT for subsequent documentation in the banking instrument. Operational objectives encompass the following:

- Identification of the specific functions and habitat types a bank is capable of replacing.
- Delineation, in spatial or hydrologic drainage terms, of the bank's service area (i.e., that surface area or lineal distance within which a bank can reasonably be expected to compensate for the loss of wetland functions).

2. Compensation for lost or degraded wetland and other aquatic habitat functions can best be assured through their in-kind replacement in close proximity to the impact site. Out-of-kind compensation or compensation relatively remote from the impact site, however, may be acceptable if determined to be practicable, environmentally desirable (e.g., bank resources are of greater overall value to a particular region), and consistent with overall land use and resource management plans.

3. Wetlands and other aquatic habitats perform discrete physical and biological functions which are of importance to the ecological, social, and economic fabric of an area. The nature of these functions, the efficiency which they are carried out, and the value which society places on them differ according to resource type, their distribution, and abundance within the landscape. Therefore, determination of the appropriateness of in-kind or out-of-kind replacement and defining the service area of a bank are decisions which should preferably be driven by resource management objectives as identified in wetland, watershed, or other types of area-wide plans. These should be taken into consideration by the bank sponsor in siting and developing the operational objectives of a proposed bank.

4. A bank service area providing the greatest likelihood of functional replacement would be one confined to the smallest possible geographic, biotic, or hydrologic area. Service area boundaries, however, should also take into consideration other social, economic, and environmental considerations in an attempt to optimize the overall contribution of banks. Spatial relationships which are the result of comprehensive planning efforts, or have been established administratively, or in law should be considered when delineating a bank's service area. At the Federal level, the only known spatial criterion pertains to banks developed under FSA for which the NRCS has adopted a hydrologic limit for bank service areas comprising a watershed with a maximum area of 250,000 acres. Several states are known to have adopted geographic limits for general mitigation purposes, including mitigation banks. Some emphasize the need to replace storm water storage, groundwater recharge, and water quality functions of wetlands and therefore, prescribe location within specified drainage area boundaries. Some emphasize habitat values and specify location within the same biotic region, while others call for consideration of both hydrologic and biotic factors. Prospective bank sponsors, Corps and NRCS representatives, and other members of the MBRT should be cognizant of official state service area requirements and take these into consideration in the planning and implementation of banks.

The geographic extent of the bank service area should, to the extent environmentally desirable, be guided by hydrologic and biotic criteria. Appropriate hydrologic guidelines are provided by the "Hydrologic Unit Map of the United States", U.S. Geological Survey, 1980[1]. Examples of biotic zonation at the national level are "Ecoregions of the United States" by James M. Omernik, 1986 (EPA, Corvallis Environmental Research Laboratory, Corvallis, Oregon) and "Descriptions of Ecoregions of the United States by Robert G. Bailey (USDA, 1980). For example, if the service area of a bank is delineated strictly along hydrologic lines, it may be found appropriate to increase the size of a bank's service area to encompass progressively larger drainage areas, initially to the U.S.G.S. **Cataloging Unit** or **Accounting Unit,** and perhaps if circumstances dictate to the even larger **Hydrologic Subregion.**

5. The operational objectives of existing banks range from very general to very specific. Examples as specified in the banking instruments for a representative group of 5 existing banks are as follows:

- Anaheim Bay, CA - Provides for out-of-kind replacement of marine fish and migratory bird habitat by creating shallow, estuarine coastal embayment habitat. The bank and debit areas, which are about 8 miles apart, are located in the same hydrologic sub-basin but in different accounting units. Moreover, any credits in excess of those needed by the immediate sponsor (Port of Long Beach, CA) may be transferred to mitigate similar deep-water-marine habitat losses at other port districts within the Southern California Bight, a potential 125-mile radius of the bank.

- Fina LaTerre, LA - This single-client (predominantly) bank provides for the in-kind replacement of wetland losses. Bank and service area are located within state-designated Hydrologic Unit 5, an area encompassing about 500,000 acres of coastal marsh. Banking instrument provides for compensation of habitat losses

1 The **Cataloging Unit** is the smallest delineated hydrologic unit in the hierarchal classification system, with successively larger units designated as the **Accounting Unit and Hydrologic Subregion**.

outside of Hydrologic Unit 5 with approval of the interagency review team, except that credits may not be applied outside the State of Louisiana.

- Millhaven Plantation (W.E.T. Inc.), GA - This privately-sponsored commercial (open for general use) wetland mitigation bank involves restoration of 350 acres of Palustrine, forested, seasonally inundated wetlands. The Millhaven Plantation bank is designed to improve wildlife habitat, improve water quality by sediment retention and pollutant transformation, and provide groundwater recharge. The bank is located in the Savannah River watershed and it provides both in-kind and out-of-kind (only non-tidal wetlands) mitigation for projects located in Chathem County which is 90% in the Savannah River Watershed and approximately 10% in the adjacent Ogeechee watershed.

- St. Charles (Land and Water Resources, Inc.), IL - This privately-sponsored commercial mitigation bank consists of riparian and emergent wetlands along with wet and mesic prairies. Functions targeted for improvement include wildlife habitat, water quality, bank stabilization, water retention, and groundwater recharge. Projects eligible for using the bank may be located inside or outside of the watershed the bank is located.

CHAPTER TWO
SUCCESS CRITERIA AND MONITORING

1. Overview and purpose

A. Determination of the status of credits or functions in a wetland mitigation bank requires development of success criteria. Success criteria are a set of standards that are employed in order to evaluate the status of a bank's physical and functional development. The status should be evaluated beginning soon after its initial establishment and extending throughout its operational life. The purpose of such evaluation is to gauge progress in the development of compensatory mitigation credits pursuant to approving their availability for withdrawal or, in the case of banks in which debiting of projected credits have been allowed, to evaluate if wetland and other aquatic resource losses have been properly compensated. (In banks whose credits are based wholly or partially on preservation, performance criteria should be developed and used to evaluate the effectiveness of bank maintenance rather than the status of bank development). These standards or thresholds allow the determination of wetland establishment. The extent to which a certain function is performed (how well a function is performed) is then measured using an assessment methodology as part of crediting and debiting methodology to assure adequate compensation of impacts to wetland and other aquatic resources. Credits are certified based on satisfaction of success criteria.

B. The status of bank development should be determined by the bank sponsor using monitoring techniques and success criteria which have been agreed to and documented in the banking instrument. Results are presented to the authorizing agency for review and approval. The MBRT should also be furnished a copy to review.

C. Success criteria should involve multiple parameters which are geared to the diverse physical and functional attributes of wetlands. Moreover, the particular criteria which are selected should be capable of evaluating the progress of bank development from its initial stage following bank establishment through a condition of functional maturity. What is suggested here are performance (or success) "thresholds" which can be explicitly linked by the authorizing agency to certification of credits (i.e., available for withdrawal).

2. Success Criteria

It is not possible to propose specific success criteria which are applicable to all wetland types, landscape positions and geographic locations nationwide. Therefore, this discussion is limited to presenting the essential thresholds for physical and functional parameters to aid the development of success criteria for a specific mitigation bank. Detailed set of criteria should be developed on a site-specific basis. In developing site-specific success criteria the basic premise should be that the criteria are ecologically valid, consistent with the goal of the mitigation project, and measurable.

Success criteria allow the determination that an aquatic resource is capable of providing specific functions. The ability of an aquatic resource to perform a function may be determined by assessing its structural components and/or evaluation of its functional characteristics.

A. Structural Components. Structural components of aquatic resources allow performance of physical, biological, chemical processes. In case of wetlands, these structural components consist of specific hydrological, edaphic, and vegetation adapted to or developed in these aquatic resources. Success criteria or standards that determine whether a wetland is capable of functioning as one may be determined by assessing these structural components. Indicators for presence of these components may be used to determine progress in development of credits in a mitigation bank.

1. Hydrology. Experience shows that the principal reason for total or partial failure of compensation projects, particularly wetland replacement efforts, is faulty hydrology which is traceable in most cases to improper design and construction rather than to natural factors. Therefore, it is of utmost importance that bank plans include explicit design criteria which are approved by the MBRT and documented in the banking instrument. The instrument should also require the sponsor to submit a project completion report which describes as-built hydrologic conditions for review by the MBRT. The MBRT should also conduct one or more on-site inspections of hydrologic conditions as needed.

Evaluation of site hydrology should look beyond instantaneous hydrologic conditions to evaluate the long-term status of surface water and/or groundwater regimes. In subtidal and intertidal environments this may be possible with a single site visit. However, in palustrine and certain lacustrine and riverine wetlands, which typically are subject to wide seasonal and episodic variations, continuous monitoring over a longer period of time may be required. For example, a freshwater wetland could present a picture of total success in hydrologic terms during a time of high inflow, but under conditions of reduced inflow could present an entirely different picture in both quantitative and qualitative terms. To facilitate monitoring of long-term hydrologic conditions, consideration should be given to the installation of test wells and staff gauges for routinely observing and recording water levels. Other evidence of wetland hydrology as indicated in the 1987 Wetland Delineation Manual include visual observation of soil saturation or inundation, watermarks, drift lines, and sediment deposits. For example, a threshold for determining establishment or presence of wetland hydrology may be, presence of wetland hydrology as indicated by visual observation of saturation within top 16 inches of soil during growing season.

It should be noted, however, that certain mitigation banks, in part, may be designed to compensate for aquatic resources that are not wetlands. For example, mitigation to impacts within areas of Ordinary High Water Mark (OHWM) that are within the Corps jurisdiction may not be not wetlands. In this case, performance standard for wetland hydrology as discussed above will not be appropriate and the success criteria should be based on the functions that are expected to be impacted (i.e., wildlife habitat or bank stabilization through presence of riparian vegetation). Other non-wetland, Corps jurisdictional areas may be deep-water habitats, in which case the hydrology criterion would be met if the site is permanently inundated at mean water depths of greater than 6.6 feet.

2. Soil. The suitability of soils is a factor principally in instances of wetland creation, and secondarily in restoration project areas in which native soils have been seriously disturbed. Although suitability of soil for establishment of a wetland mitigation bank is a significant factor for ecological success, it should be addressed during the initial bank siting and may not be suited for use as a success critierion. In some circumstances it may be considered feasible for a bank to involve soils management, such as when this entails the mechanical or chemical improvement in soils properties or the actual importation of preferred soils types.

The suitability of wetland soils as a biological matrix is determined largely by their texture. Clays, loams and organic soils are generally conducive to the development of reducing conditions and a broad spectrum of vegetative species and communities. Sands, sandy loams, gravely and coarser soils could be too permeable retain sufficient water and, depending on hydrology, could result in xeric conditions which might seriously limit vegetative survival. Presence of impermeable layers such as clay lenses, at the top horizons of the soil, may cause slow permeation of water and lead to development of reducing conditions in a sandy soil. Soils which tend to be rocky may not provide a proper matrix for root development irrespective of hydrologic conditions.

Determining the suitability of wetland soils should go hand in hand with the assessment of groundwater hydrology. Predictions of soil impacts on bank performance can be based on textural analysis and soil moisture testing. The actual design standards to use in this case should be the specific life requisites of the vegetative species being established.

Since soils can be managed such that they meet the hydric soil criterion, success criteria may be based on the combination of hydrology and vegetation characteristics of a wetland mitigation bank.

3. Vegetation. The status of vegetative development in banks should be determined using as standard vegetative norms as they occur in the area in which the bank is located. The principal factors considered in the development of success criteria should be (a) extent or pattern of coverage, (b) density or number of stems per unit area, and (c) individual rate of growth. The following vegetation success criteria, when combined with hydrological success criteria, may be applicable to both planted and non-planted wetlands:

- **!** Species Composition. This refers to the presence of obligatory or faculative wetland species (in terms of cover or density and is important in assessing the presence of wetlands.

- **!** Species Diversity. Successful establishment of a specific number of wetland species may be a desirable criterion. Representative number of wetland species for a particular type of wetland, at each vegetation layer may be obtained from reference sites in the wetland mitigation bank area.

- **!** Aerial Coverage. Aerial coverage is a measure of successful development of each vegetation layer.

- **!** Evidence of Reproductive Success. Visual observation of reproductive success would indicate the health of the system. This element may be more suitable in systems where natural processes such as floods continuously change the extent of aerial coverage.

- **!** Rate of Survival. Typically during the first year of wetland establishment it may be expected to have lower rate of vegetation survival (e.g., approximately 50%). The rate of vegetation survival should increase up to some specified percentage by the fifth year of establishment.

- **!** Percentage of Non-Native Vegetation. Presence of non-native wetland vegetation in many instances leads to significant degradation of wetland functions. The vegetation success criteria should establish a threshold for the relative percentage of non-native vegetation cover. Success criteria for wetlands which are enhanced through eradication of undesirable plant species should be based on the extent of such population reductions and/or the concomitant increases in the native wetland species composition, diversity, and growth rate.

Coverage (and density) serve as a proxy for vegetative "health" and are preferred criteria to use in banks which involve the establishment of emergent or submergent vegetation in both wetland and deepwater environments. However, in forested and shrub/scrub wetlands, in which coverage density is more or less fixed, the criteria should be rate of survival (a direct measure of density) and the relative rate of growth of individual plants.

B. Functional Characteristics. Assessment of functional goals of a mitigation bank in addition to the structural success criteria may be used to gauge development of a mitigation bank. The ability of wetlands to perform recognized physical functions (wildlife habitat, water quality improvement, shoreline protection, floodwater storage, groundwater recharge and discharge) is site specific and in majority of cases develops over time. Use of functional success criteria alone for sale of credits is not recommended because of the temporal aspects of development of wetland functions. Typically, functions performed by a wetland are assessed through the direct, on-site analysis and measurement of animal and plant populations and ecological relationships using success criteria and study procedures which are tailored to the situation. Some examples of functional success criteria are presented below:

1. Fish and/or Wildlife Habitat. To the extent that the operational objective of a bank might be to replace population of a critical aquatic or terrestrial animal, the success standards can be presence of sustainable populations of such species. If the goal is to provide habitat for a multitude of species native to that habitat,

the success criteria may be presence of several species belonging to several feeding guilds (species at the same trophic level which use similar resources). For example, the success criteria for restoration of native avifaunal habitat may be presence of specific number of species representing several feeding guilds.

2. Primary Productivity. If maintenance of the detrital input of wetlands to an estuarine area is the objective, then net rate of productivity and mechanisms associated with energy transport might be used as success criteria.

3. Water Quality Improvement. The goal of a mitigation bank may be to improve water quality. Elements of success criteria for this function would include measurements at both inlet and outlet sources for BOD, nitrogen, phosphorus, pesticides, or other desired water quality parameters. Specific standards for each parameter should be established to assess the success.

One or a combination of numerous recognized functions of a wetland may be used to evaluate success of a mitigation bank. Functional success criteria may be used toward later stages of operational life of a mitigation bank in conjunction with the physical success criteria.

3. Monitoring

A. A program of periodic monitoring, with provision for rectification of any human and natural problems, should be instituted in order to assure that bank development and management is in accord with established technical specifications and to validate the availability of compensation credits. A monitoring plan covering a bank from its initial implementation throughout its operational life should be included in bank plans for review and approval by the MBRT as part of the banking instrument. A monitoring plan should exist irrespective of the methods used for initial credit production or level of management. The monitoring plan should apply to the entire bank area or to individual phases in a bank which is undergoing phased implementation.

B. Monitoring efforts should culminate in written reports which are submitted to the authorizing agency and distributed by that agency to the MBRT for review. Monitoring should provide sufficient written and graphic descriptions of bank conditions to enable the agencies, in conjunction with site inspections, to evaluate the effectiveness of wetland management and to verify the availability of credits.

C. Performance monitoring should be initiated following bank establishment and continued at regular intervals throughout the operational life of the bank (or some other pre-defined point in time agreed upon by the signatories to the banking instrument). The frequency of monitoring may vary depending on the credit production methods and the nature of the wetlands involved. For example, a bank comprising an emergent intertidal marsh or an lacustrine fishery habitat could become functionally mature within a few years and the monitoring schedule could follow and equally tight time-frame. On the other hand, monitoring for a created bottomland hardwood stand which requires literally decades to become functionally mature could follow a much more attenuated schedule.

D. Development of a monitoring program should also be responsive to special circumstances that exist on a case-by-case basis. Banks that have uncertain water sources, marginal soils, or have been subject to diseases, natural disasters and other systemic problems that heighten the risk of failure should be monitored on a frequent basis.

CHAPTER THREE
DETERMINATION OF CREDITS AND DEBITS

1. Credit production techniques

The objective of a mitigation bank is the production of credits, above a predetermined baseline value. which can then be debited to compensate for functions and values which are lost due to authorized impacts or agricultural conversions. The production and maintenance of credits can be done using one or a possible combination of methods described below. All these credit production methods are capable of developing and maintaining self-sustaining ecosystems.

- Restoration of degraded or former wetlands.
- Creation of wetlands through construction on sites where such environments do not now exist.
- Enhancement of existing wetlands. i.e., improvement above a baseline condition.
- Preservation of existing wetlands.

A. Restoration. Wetlands restoration involves the return of the natural hydrological regime, biological conditions and functional integrity to areas which once were viable wetland areas. Owing to its generally high success rate in the return of functions when compared to other credit production methods, restoration is preferred for use in wetlands mitigation banking. Because credits are determined with respect to a baseline, the most seriously degraded sites provide the greatest opportunity for credit production. However, this fact not withstanding, site selection should favor those locations which present the greatest potential for the development of self-sustaining wetland systems. Typically this favors sites which present the surest opportunity for the development and maintenance of proper hydrologic conditions and those in which hydric soils continue to exist. Examples of techniques commonly involved in wetlands restoration include:

- Blockage of drainage tiles, culverts or drainage channels.
- Restoration of surface drainage patterns and water sources.
- Removal of dikes and other water barriers.
- Restoration of historic hydrologic linkages between wetland areas.
- Removal of fill material, waste and debris.
- Revegetation and/or vegetation control.
- Control of incompatible uses.

Frequently, the return of historical hydrologic conditions is sufficient to assure the restoration of a wetland area and its associated functions and values. Moreover, if the site has been only nominally affected and remnants of former flora and fauna remain, restoration of biological and ecological functions might be possible through natural means. In such circumstances, following restoration of historic hydrologic conditions, bank sponsors may find it more cost effective to withhold vegetative restocking until the results of natural regeneration can be assessed, even though this may entail a greater lag time in the accrual of credits.

B. Creation. Creation of wetlands can be effective for credit production if natural conditions with respect to landscape position, hydrology, soils and vegetation are successfully replicated. However, because these variables are difficult to control, the success rate in creation tends to be low when compared to restoration and other methods.

Maintenance of proper hydrologic conditions is the key to successful wetland creation. In general, creation of intertidal habitats has had the most success and predictability due to greater likelihood of replicating natural hydrology. Least success has been with freshwater systems with uncertain, fluctuating water sources.

Creation of a wetland substrate can involve three basic engineering techniques depending on the nature of the site:

- Excavation of upland areas to intercept surface or ground water.
- Diking and flooding of upland areas.
- Filling of deep water areas (fresh, brackish or salt) to establish proper water depth and substrate.

A problem with many wetland creation proposals is that they involve the destruction of one valuable habitat to create another. This is true in cases of the filling aquatic areas to create wetlands, and excavating and/or diking valuable upland environments. Bank development plans involving excavation and diking should also be subject to close scrutiny from the engineering and hydrological standpoints which, historically, have been the principal reasons behind failed attempts to create wetlands. Of these two engineering methods, excavation has the greatest potential for success because it provides better opportunity to develop and maintain satisfactory hydrologic conditions. The effectiveness of diked systems should be particularly suspect if flooding is accomplished with pumps, because of increased opportunity for failure. As with all mitigation bank proposals, it is appropriate to evaluate individual proposals on their merits and to base decisions on the overall environmental risks and benefits.

Created or modified substrates may revegetate naturally, particularly if a source of plant propagules is located nearby. but most often they require planting or seeding. Establishing wetland vegetation may simply be a matter of seeding or transplanting but can on the other hand entail a more complete range of horticultural practices including soil preparation, fertilization, weed control and cultivation.

Particular care should be exercised with respect to creation of forested and scrub shrub wetland systems. Many of the typical forest and shrub species are facultative and capable of survival and growth over a wide range of soil moisture conditions and soil types, and revegetation may be possible in areas which are not classified as wetlands according to Federally recognized hydrologic and edaphic criteria. Therefore, care should be taken in the development and review of wetland creation plans to assure that the areas in question satisfy applicable wetland delineation criteria.

C. Enhancement. Although the improvement above baseline conditions of one or more wetland functions can generate credits, it generally produces less credits than restoration or creation because the degree of improvement to be expected is often marginal and in many cases may not even be measurable using traditional wetland evaluation methods. Furthermore, the enhancement of one wetland function sometimes results in the loss or reduction of others. Some examples of wetlands enhancement techniques are:

- Improvement of drainage patterns and flushing rates.
- Under-planting of bottom land hardwood areas with special mast-producing trees.
- Cessation of deleterious uses (e.g. cattle grazing, off-road vehicle use, dumping, and other de facto uses) by fencing and control of trespass.
- Control of undesirable vegetation (e.g. exotics).
- Installation of waterfowl nesting facilities.
- Removal of natural barriers to fish and wildlife migration and stocking with desirable fish and wildlife species.
- Acquisition and management of buffer strips around wetland areas for the provision of food and cover, and improvement of water quality.
- Development of special habitat areas (e.g., upland and deep water areas) by filling, excavation or damming.

D. Preservation. Preservation may be accomplished through the implementation of appropriate legal mechanisms (e.g. transfer of land title, conservation easements, restrictive covenants) to protect wetlands,

accompanied by changes in land use such as cessation of grazing, cultivation and other incompatible activities. Preservation may also entail physical measures such as fencing and erosion control.

As stated in the Federal Policy Guidance (Section II.B.4), preservation is not a preferred method of credit production because predicting the destruction or degradation of existing wetland areas -- the basic premise justifying preservation -- may be highly uncertain. Furthermore, when preservation is used to compensate for wetland loss, short-term net loss of wetland acreage may occur. Accordingly, preservation may be included as the sole basis for credits only under exceptional circumstances.

2. Designing for Maintenance

An underlying objective in mitigation banking is the development of self-sustaining wetland systems. Banks which are not self-sustaining and require extensive maintenance introduce a higher probability of failure which can jeopardize the basic purpose of a bank. For example, a bank dependent on a pumping plant for its water supply or involved other engineering features requiring regular maintenance would be inherently more prone to failure than one with a natural supply of water involving a non-structural approach. Ease of maintenance and sustainability should be carefully considered in bank planning, design and implementation. Banks which carry a high risk of failure may need to consider commensurately high compensation ratios and/or require the sponsor to provide an appropriate level of financial assurances.

3. Baseline documentation

Baseline documentation is an essential element of detailed bank planning. Its purpose is to characterize the "floor" above which a mitigation bank is developed, its success is determined, and above which the type and amount of compensatory credits are measured. The term "baseline conditions" refers to conditions which exist at the time the bank is proposed to be implemented as well as conditions which are expected to prevail in the future under a "without bank" scenario.

The exact technical requirements for baseline documentation should be developed on a case-by-case basis given the site-specificity of bank proposals. Areas which contain few if any preexisting wetlands and which are relatively uniform in topographic, biological and hydrologic terms, may require little by way of survey work for the documentation of baseline conditions. However, areas which are geologically and biologically complex may require extensive survey work, mapping and evaluation.

Baseline characterization of wetlands should be done on a sampling basis with the use of sample plots or transects. Sites within the bank should be located using stratified selection techniques which assure that all existing wetland and non-wetland systems (both upland and deep water), as well as topographic, hydrologic and soil regimes are properly represented. Sample plots or transects should be made permanent and be appropriately marked to facilitate future bank monitoring. The suggested scope and content of baseline documentation reports are as follows:

- Hydrology -- surface and/or groundwater sources; surface and groundwater elevations; duration, frequency and depth of surface water inundation or soil saturation; bathymetry of deep water areas; circulation pattern and rate of replacement: water quality; salinity.
- Description and mapping of any existing water control structures.
- Description, mapping and functional evaluation of existing wetlands.
- Soil series and soil mapping.
- Topography and vegetation of upland and transition areas within and surrounding the bank area and their effect on the evaluation of the overall bank area.

- Physical and biological characteristics of existing deep water environments and their effect on the evaluation of the overall bank area.
- Description and mapping of cultural resources features.
- Description of present and future land uses within and surrounding the bank and their probable effects on the bank's prospective functions and values.
- Determination of potential preservation credits for existing wetlands.
- Designation of sample plots, transects and reference sites. Sites should be sufficient in number to represent the full spectrum of cover types; topographic, hydrologic and soil regimes; prospective wetland types and aquatic resources and management activities taking place within the bank.
- Establishment of test wells and staff gauges, as necessary, for the determination of hydrology and soil moisture levels under pre- and post-bank conditions.
- Detailed site map; mapping should be at the largest possible scale, preferably using available topographic maps or aerial photographs as a base.
- Ground-level and low-level aerial oblique color photographs of representative bank areas (to assist future monitoring and the determination of credits).

4. Evaluation of Credits and Debits

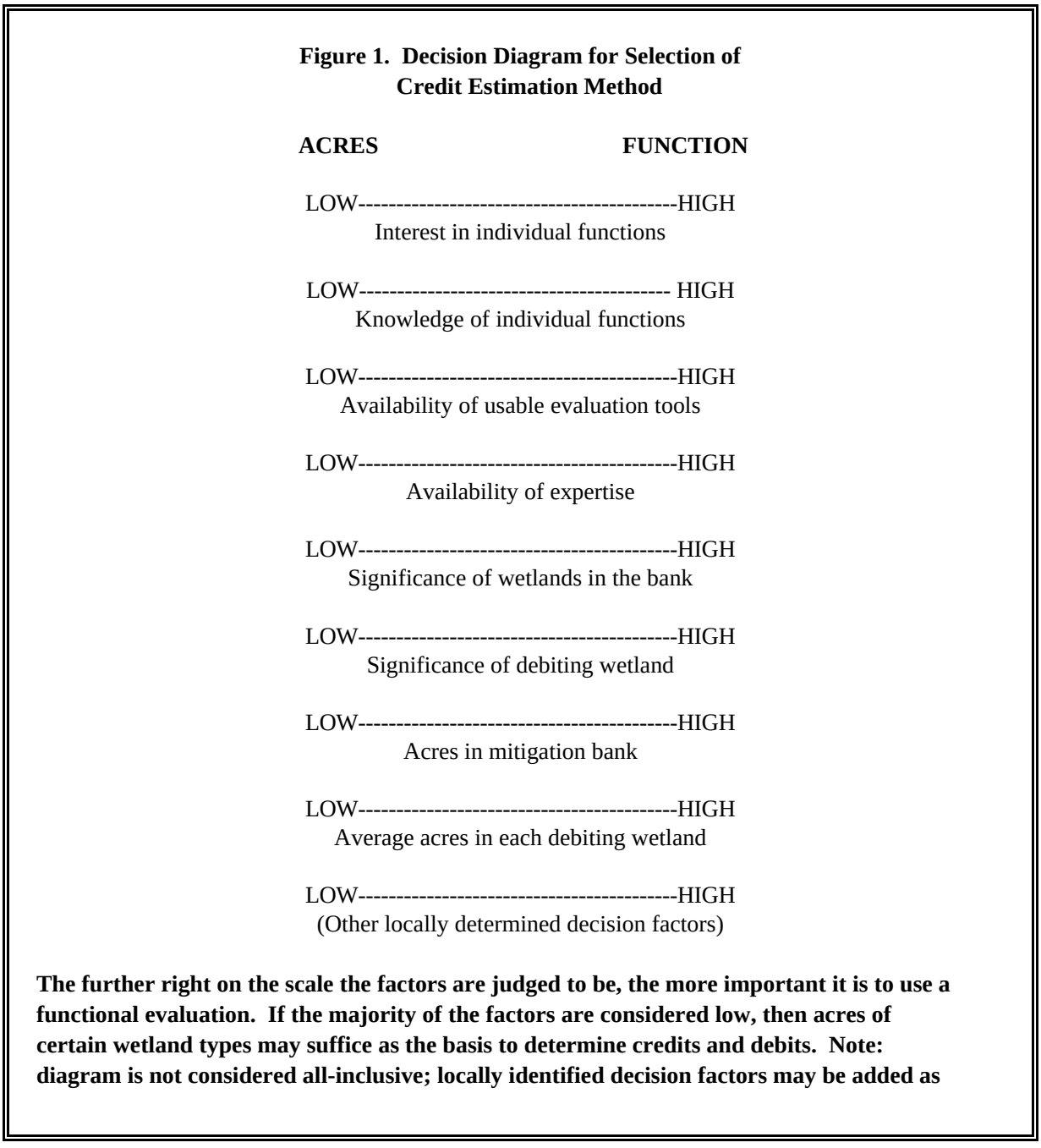
In all cases, the amount of credits in a bank is net increase of the functions due to implementation of the bank, which means that credit determination must take baseline functions into consideration. The proper evaluation of credits therefore requires pre- and post-project evaluation. In like manner, determination of authorized losses (debits) should also take into account qualitative changes over time due to effects which might be unrelated to the immediate causative factors. Determination of debits should employ the same methods which are used to determine credits.

Wetland credits and debits may be measured in either acres or functional units. It is desirable to use an approach that can be documented, consistently applied (by different individuals or by the same individual at different times), allows quantitative and qualitative assessment of wetland functions, and one that can be used to compare existing conditions with future conditions. Credits and debits should be enumerated according to wetland type or other aquatic habitat classification.

Neither acreage nor functional units can be specified as the correct measure for credits and debits in this document. Several criteria must be evaluated on a case-by-case basis to select the appropriate credit and debit unit (Figure 1). In general, the need to use functional units rather than acreage increases with the significance and complexity of the system, the size of the bank and size of the debiting losses, and interest in a particular function. However, the use of acreage may be required when the knowledge of functions, availability of assessment techniques, or availability of expertise is low. Local factors may also affect the selection of credit/debit units.

There are four general classes of methods for determining credits and debits consisting of inventory (uses acreage units), expert scoring (subjective scoring), diversity/production indices (semi-quantitative), and functional evaluation methodologies (single function or multiple function methods).

Figure 1. Decision Diagram for Selection of Credit Estimation Method



The further right on the scale the factors are judged to be, the more important it is to use a functional evaluation. If the majority of the factors are considered low, then acres of certain wetland types may suffice as the basis to determine credits and debits. Note: diagram is not considered all-inclusive; locally identified decision factors may be added as

A. Inventory. An inventory results in acreage with no inherent indication of quality. However, if more than one resource type exists and the inventory is stratified by type, special attention can be given to preferred or sensitive types. Alternatively, portions of a bank can be stratified by quality determined by another approach, such as subjective scoring, then acreage is calculated for each stratum. Inventory can include combinations of wetlands and other resource types to focus on and characterize a resource complex. e.g., a palustrine forested wetland with associated streams, or an estuarine embayment with associated intertidal marsh.

B. Expert Scoring. An expert in a particular wetland class or function can provide a rating or score which can be used to calculate credits. The process is one of locating the expert, defining the purpose and conditions under which a score is to be given, and obtaining the score supported by appropriate documentation. Points to cover include a statement of necessary assumptions, definition of the study area and study purpose, and description of the importance of documentation. It is beneficial to obtain justification or basis for why each score is given, factors considered and ignored, and other assumptions and basis for the score. The expert should place wetlands in context and record how this site compares with other sites in the region -- is it one of the best for one or two functions, or just average?; does it lack a particular feature? The comments can be used to direct restoration activities, such as, identifying problems in the area that depress the score but are capable of correction.

C. Diversity/Production Indices. Data collected on the ecological diversity and/or productivity of wetlands and other aquatic habitats can be translated into indices. When interpreted with area, such indices can be used for determination of credits and debits. For instance, a diversity index or measure of species richness can be used as a direct, though relative, rating of value. Under the assumption that higher species richness indicates a better quality wetland, if there are 24 plant species in a mitigation bank (credits), and 12 plant species in a 10-acre wetland or other aquatic resource that would be impacted (debits), then it would be possible to compensate the loss by debiting 5 acres of the bank if the compensation ratio was l:l. An example of a production diversity index is the "Index of Biological Integrity" developed for aquatic systems (Karr, et al., 1986); its key variables are species richness and composition, trophic and reproductive function, system's health and fish abundance. Production indices can be used to derive Habitat Units as in the Habitat Evaluation Procedure (described later in this section).

D. Functional Assessment Methodologies. Functional assessment methods examine the ability of a wetland to carry out selected functions. The Habitat Evaluation Procedure (HEP) developed by the U.S. Fish and Wildlife Service (1980), the Wetland Evaluation Technique (WET 2.0) developed by Adamus et al. (1987), and the Hydrogeomorphic Approach (HGM Approach) developed by Smith et al. (1995), represent some of the prominent methods in this class.

1. Habitat Evaluation Procedure (HEP). HEP is a quantitative methodology to determine suitability of an area as habitat for selected species of fish and wildlife. Results are expressed as Habitat Units (HU) which can be used as direct measures of credits and debits. HU's are derived by multiplying area of a given habitat type by an index of habitat quality or Habitat Suitability Index (HSI) for selected fish and wildlife species or other evaluation element of interest such as a species life stage. HSI scores are arranged on a scale of 0 to 1.0, with 0 meaning no or unsuitable habitat and 1.0 meaning optimum conditions. An area that scores 0.8 is assumed to provide habitat twice as suitable for a species as an area that scores 0.4. HEP also provides calculation of Average Annual Habitat Units (AAHU) to incorporate changes in habitat quality and quantity over time (years).

The benefits of HEP include its quantifiable results, structured process, replicability, and the ability to tailor an evaluation to a specific location and important resources. Any fish or wildlife species or community in any ecosystem may be evaluated once the appropriate models are constructed. One of HEP's principal benefits therefore is its ability to assign HU or AAHU values when the resource areas in question are of different types, thereby providing a scientific basis for out-of-kind replacements.

The utility and quality of a HEP application depends largely on the selection and availability of models. In general, birds and mammals are fairly well represented by available models, fish are less well represented, and invertebrate models rare. Therefore, limitations of HEP include lack of models for all animal species and the fact that it is a single function (fish and wildlife habitat) evaluation methodology, whereas wetlands provide a multitude of known functions. Accuracy of a HEP evaluation depends largely on correct delineation of acreage and determination of HSI scores. An application can be poorly done or biased by errors in describing the study

area, selecting evaluation elements, selecting or using models, and making improper assumptions while calculating scores. Also, HSI models do not incorporate several factors beside habitat that affect fish and wildlife, such as climatic factors, inter-species relationships and human interference.

Several precursors and modifications of HEP exist. The most common is an alternate way of deriving the index of quality (HSI), e.g., the Missouri HEP which uses models built for land use and wildlife management purposes. The Habitat Evaluation System (HES), developed by the Corps for use in project planning, and a 1976 version of HEP were designed to determine habitat quality for multiple species in a given land use cover type. Recent movement toward an ecological perspective in evaluation has led to development of models for cover types in bottom land hardwoods in the southeast, river/riparian systems in the west, coastal wetlands in Louisiana, and small freshwater wetlands in West Virginia.

2. Wetland Evaluation Technique (WET). WET 2.0 is a multi-functional evaluation procedure which can be used to assess functions and values of a wetland in terms of its capability to perform a function. That probability is based on: the wetland's physical, chemical, and biological characteristic (effectiveness); the opportunity of a wetland to perform a function (opportunity); and the value of the wetland functions to society (social significance). WET 2.0 can provide a qualitative rating of high, medium, or low for up to 11 separate functions indicating a probability level that the functions take place in a wetland. WET 2.0 was designed to provide an initial, rapid assessment of functions. It is intended for users who do not have an interdisciplinary team of wetland scientists on hand. It serves as a checklist to help users consider multiple functions, and as a method of examining functions in a relative fashion. WET 2.0 was not designed to provide quantitative results as the ratings are in the form of relative rankings and cannot be mathematically manipulated. The magnitude of difference between a wetland rated "high" in a function and one rated "moderate" is unknown and not necessarily the same difference as that between "moderate" and "low". WET 2.0 was not designed to combine functional ratings into one wetland score. The principal value of WET 2.0 in mitigation banking is its ability to establish the probability that bank or debit wetlands exhibit certain functions. Other approaches can then be used for the actual determination of credits and debits.

3. Hydrogeomorphic Approach (HGM Approach). The HGM Approach is an assessment methodology based on the Hydrogeomorphic classification system that classifies wetlands into groups based on geomorphic, water source, and hydrodynamic characteristics of a wetland. Wetland functions are assessed in terms of Functional Capacity Index (FCI). Functional Capacity Index is the ratio of functional capacity under predicted or expected conditions, and the functional capacity under attainable conditions. Attainable conditions are the highest, sustainable level of function achieved across a number of wetlands that have been under minimal long-term anthropogenic influence in a landscape. The FCI is then a measure of a wetland function relative to that in similar undisturbed wetlands in the same region.

Functional capacity is measured using an assessment model. Assessment model is a measure of characteristics between the ecosystem and its surrounding landscape variables, and the functional capacity. The variables are measured using indicators that measure the relationship between a variable condition and the functional capacity in the reference wetland. The variables are assigned a subindex on a scale of 0.0 to 1.0 based on the relationship between a variable and the functional capacity of a wetland. The reference wetland is assigned a subindex of 1.0 that represents the level of functional capacity under attainable conditions. The subindex ratings of variables for an assessment model are then added to obtain the functional capacity of a wetland. The FCI is a per unit measure of capacity of a wetland to perform a function relative to reference wetlands in that region. The actual measure of a wetland function for the assessment area, or the Functional Capacity Unit (FCU), can be derived by multiplying the FCI by the area of a wetland.

The primary advantage of the HGM Approach over other assessment methods is that it is tailored to regional characteristics of wetlands. In addition, multiple wetland functions may be assessed once assessment models based on the reference wetlands in a region are developed. In case of mitigation banking, the HGM

Approach may be used to determine the current and expected condition of wetland functions. However, the MBRT still has to decide on the relative importance of functions within the suite of relevant functions since there is no one single rating. Further, the comparative evaluation of differing wetland classes still needs to be determined.

5. Determination of Compensation Ratios

The compensation ratio is the number of units of credit (acreage or functional units) which are determined to be needed to be debited from a bank to compensate for one unit of wetlands lost. The February 6, l990 Memorandum of Agreement between the Department of the Army and EPA pertaining to mitigation under Section 404, provides for a minimum 1 to 1 ratio by area as a surrogate when definitive information relative to functional replacement is lacking. There is no comparable policy pertaining to FSA.

Compensation ratios are determined by the Corps and NRCS on a case-by-case basis coincident with the Section 10/404 permit evaluation process and/or review of FSA plans for wetland conversions. Compensation ratios should not be expected to remain static, as they are subject to adjustment upward or downward as biological, physical and chemical conditions (i.e., credit valuation) at a bank change over time. Such adjustments should normally take place coincident with periodic bank monitoring. Some MBRTs may want to identify and document in the banking instrument the protocol by which compensation ratios are to determined on a case-by-case basis.

Factors for consideration in the determination of compensation ratios included the following:

! **State of bank development at time of debiting.** When the bank resources are functionally equivalent to the wetlands which are lost, a compensation ratio of "1 debit to 1 credit" may be appropriate. However, when bank resources are not yet functionally mature, their replacement value may be modified by the extent of functional deficiency. For example, if a bank's state of development at the time of debiting has been determined to be 25% of anticipated functional maturity, credits should be discounted by a factor of 4 (i.e., 100% divided by 25%). In this example, if the state of bank development is the only basis for the compensation ratio, 4 credits would need to be withdrawn to compensate for each unit of loss (i.e., 4 to 1 ratio). In the case of credits generated by preservation, either whole or in part, if the preserved aquatic resources are assumed to be functionally mature, the compensation ratio should reflect this. However, when credits are produced through restoration, creation or enhancement, a developmental lag to functional maturity may be expected, and accordingly the compensation ratio should reflect this through discounted value of the credits. Subsequent compensation ratios could be based on successive performance monitoring with the extent of discounting progressively reduced until, at functional maturity, credits may be withdrawn at full value.

! **Quality of bank resources in relation to the quality of debiting wetlands.** This factor refers to the comparative significance of the respective resource areas in terms of the extent of physical and biological functions which they perform and the values which are ascribed to such functions. For example, if bank wetlands perform twice as many functions, or important functions are performed twice as well as debiting areas, the bank is clearly of superior quality and its credits could therefore be traded at a premium.

! **Sustainability of bank resources.** This factor refers to the relative ease or difficulty of maintaining the physical and functional integrity of a bank and the associated risk of failure of maintenance efforts. If a bank is designed to be entirely self-sustaining (e.g., possess dependable, hydrologic sources, and have minimal dependence on man-made features), risk of failure is minimal, and there should be no need to discount the value of credits. On the other hand, a bank which relies on engineering features which are

subject to potential failure, requires continuous manipulation of its life support systems, and otherwise has a high degree of artificiality, has a decidedly increased risk for failure. The degree of risk could be reflected in an appropriate discounting of its credits yielding a commensurately higher compensation ratio.[1]

Compensation ratios might also be considered in the context of a bank's operational objectives and even become formally documented in the banking instrument, to the extent possible, since the compensation ratio will vary with bank condition and quality of the wetland authorized to be developed. The basis for its determination should be specific to the permitted loss. Such considerations may cover (a) the nature of mitigation replacements and (b) service area designation. For example, a 1 to 1 ratio might be considered appropriate when in-kind replacement of wetland losses is provided for; however, when replacement is out--of-kind discounted credits and a ratio in excess of 1 to 1 may be appropriate. In like manner, replacement within the same watershed (e.g., same Cataloging Unit) in which the loss of resources takes place might call for a 1 to 1 ratio, whereas replacement in more remote locations might justify a higher compensation ratio.

6. Credit Certification and Timing of Credit Withdrawal

Section II.D.6. of the policy guidance states that for banks where the credit production methods is either or some combination of restoration, creation, and enhancement, "the number of credits available for withdrawal (i.e., debiting) should generally be commensurate with the level of aquatic functions attained at a bank at the time of debiting." The level of aquatic functions is based on the attainment of performance criteria or use of a functional assessment methodology. Recognizing financial considerations, flexibility is offered in that credits may be withdrawn based upon a projected level of aquatic functions at a bank.

Prior to any debiting at a bank, the following must be satisfied: (a) banking instrument and final mitigation plans have been approved, (b) the bank site must be secured through real estate assurances, and (c) appropriate financial assurances are in place. In the case of banks where credit production is based solely on the preservation of existing aquatic resources, credits may become available for debiting once the appropriate legal protection, banking instrument, land use and physical changes as necessary, are implemented.

A bank may become operational initially when credits are certified by the authorizing agency. Credits are said to be "certified" at a point in time when the authorizing agency has determined the number of credits available for withdrawal. The determination of certification is based upon meeting minimum requirements stipulated in the banking instrument. For example, certification of credits based upon the attainment of prescribed success criteria demonstrating bank successful establishment, will likely require information (e.g. bank development plans, job completion report, performance monitoring reports) to be submitted by the bank sponsor to the authorizing agency for review. Such information may be supplemented by site inspections conducted by the authorizing agency and MBRT. In another example, a limited number of credits may become certified on the basis of design criteria for a bank. Subsequent certification of remaining bank credits should take place incrementally as bank development progresses as evidenced by monitoring results and satisfactory achievement of success criteria. In the case of banks wherein the sole basis of credit production is preservation of existing aquatic resources, credits may be certified immediately upon the implementation of legal protection, approval of the banking instrument, accompanied by changes in land use, or other physical changes.

---

1 Risk of failure can be accounted for in alternative ways: (a) use of compensation ratios which discount the value of credits on the degree of risk, (b) requiring bank sponsors to provide financial assurance which is also commensurate with the degree of risk, and (c) by providing for a combination of the two.

Where certification of credits is based on achievement of success criteria, credits become available incrementally in accordance with the pace of wetland development. However, when design criteria are applied as a basis for certifying a limited number of credits, credits become available based on a projection of anticipated wetland conditions. It is plausible to apply both sets of criteria for credit certification. For example, success criteria might be used to initially approve the availability of credits based on the successful establishment of suitable hydrologic conditions, with design criteria used for subsequent certification of credits based on projected biological development.

In all cases, credits that are based on projected biological conditions must be verified through periodic monitoring, and if credits do not agree with predictions, adjustments of credit balances upward or downward will be necessary. If there is a shortfall in available credits it may also be necessary to suspend bank operation and for the sponsor to identify the causes for retarded bank development and take appropriate corrective action.

References

Adamus, Paul, E. J. Clairain, Jr., R. D. Smith, and R. E. Young. 1987. *Wetland Evaluation Techniques (WET), Volume II: Methodology.* U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, 178 pp.

Smith, Daniel, A. Amman, C. Bartoldus, M. M. Brinson. 1995. *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices.* U.S. Army Corps of Engineers Waterways Experiment Station Technical Report WRP-DE-9, Vicksburg, MS, 88 pp.

U.S. Fish and Wildlife Service. 1980. *Habitat Evaluation Procedures Manual.* 102 ESM, Washington, D.C.

CHAPTER FOUR
ACCOUNTING PROCEDURES AND FORMATS

The bank sponsor is required to maintain up-to-date records of all banking activities. Banking transactions should be accounted for in an annual ledger, with individual statements prepared at the time of each transaction to reflect the activity. Statements are then forwarded to the authorizing agency at the time they are generated; the annual ledger should be forwarded to the authorizing agency on a yearly basis along with the monitoring and maintenance report.

The authorizing agency may also require bank audits on an as-needed basis throughout the bank operational life. Justification for audits may be the existence of discrepancies in accounting records or physical changes in a bank which significantly affect credit status. In the latter event it would be appropriate to call for audits in conjunction with monitoring events. Conduct of audits should be the agency's responsibility.

Statements should be submitted following each (l) debiting action, (2) increment of credits added to a bank, and (3) performance monitoring event. Statements should provide running accounts of banking activity from the initial credit approval by the MBRT to the latest accounting. The statements should document all debits (referring to the Corps permit number, any credit additions, and credit balances. Separate accounts should be provided for all wetland classes in a bank as specified in the banking instrument.

A sample format for consideration in the development of account statements is provided on the following page. The sample statement illustrates reporting in acreage and functional units (e.g. Habitat Units or Functional Capacity Units).

The sample statement is an example where a bank contains two classes of wetlands and functional units are used to measure credits. Acreage may also be included in this type of statement to allow monitoring of net changes in acreage. Sample statements may be modified to represent special characteristics of a mitigation bank.

(Sample Account Statement)
___ Mitigation Bank
Functional Unit Based

PF01 **PF04**

Date	Notes	Deposit FU(acre)	With-drawal (FU)	Balance (FU)	Comp. Ratio	In-Kind (Y/N)	Deposit FU(acre)	With-drawal (FU)	Balance (FU)	Comp. Ratio	In-Kind (Y/N)	Total With-drawal	Total Balance (FU)
02/10/94	(1)	200(50.0)		200			75(25.0)		75				275
04/21/94	(2)		15	185	3:1	N		25	50	2:1	N	40	235
07/02/94	(3)		10	175	3:1	N		35	15	1:1	Y	45	190
12/16/94	(4)	60 (20)		235			40 (10.0)		55				290
05/30/95	(5)		25	210	1:1	Y		20	35	2:1	N	45	250
06/15/95	(6)		60	150	1:1	Y						60	190
09/10/95	(7)		20	130								20	170
TOTALS		260(70.0)	130				115(35.0)	80				210	

Notes:
(1) Initial credit balance approved by MBRT (1 F.U. = 0.25 acres)
(2) Debit authorized by Corps Permit #94-220
(3) Debit authorized by Corps Permit #94-300
(4) Deposit approved by MBRT at first performance monitoring (1 F.U. = 0.2 acres)
(5) Debit authorized by Corps Permit #95-444
(6) Debit authorized by Corps permit #95-910
(7) Performance monitoring: credits reduced, bank conditions deteriorated

* Two types of habitats are represented.
* Type of credit production method is represented in the functional unit.

CHAPTER FIVE
FINANCIAL AND LEGAL ASSURANCES

The bank sponsor is responsible for securing sufficient funds or other financial assurances to cover contingency actions in the event of bank default or failure. Further, the wetlands and/or other aquatic resources in a mitigation bank should be protected as specified in the banking instrument with appropriate real estate arrangements.

1. Financial Assurances

A. Financial assurance mechanisms can provide funds to undertake contingency or remedial actions in the event of technical failure or sponsor's default. Financial assurance for remedial actions may be needed as a condition to allow early debiting of projected credits (credits not yet established). These funds would be used in the event the debited credits do not meet the success criteria or in cases where conditions of debited credits deteriorate during the operational life of a bank. Financial assurance mechanisms can also be used to assure availability of funds for long-term maintenance of a bank.

B. The extent to which sale (i.e., transfer of credits to a permittee) of early credits may be permittable for a particular mitigation bank is decided during the detailed planning and design phase. Debiting of certified credits can be authorized following attainment of the success criteria. The Chair of the MBRT, the Corps or the NRCS, however, may approve sale of credits prior to attainment of success criteria, and portions of the total anticipated credits may be certified for debiting based on the projection of anticipated wetland functions. In cases where use of the bank (i.e., debits) is approved prior to achievement of success criteria, financial assurance by the sponsor may be necessary to protect against the risk of failure. Early debiting of credits may be approved to reduce the financial burden of the sponsor, while minimizing the affect of the bank's failure.

C. The nature of remedial actions to be taken in the event of partial or total bank failure depends on the nature of causative factors. Generally remedial actions in response to failure due to catastrophic events or natural phenomena which are beyond human control (e.g. drought, flood, disease) are not considered feasible although there may be exceptions. In such cases, remedial actions may involve little more than temporary suspension of debiting or adjusting the compensation ratio upwards) pending the return of favorable conditions.

D. When remedial actions have been completed and determined to be in accord with the success criteria, the relevant amount of financial assurance should be released by the Corps or NRCS. Stipulations pertaining to timing of credit withdrawal, contingency actions in the event of technical bank failure, and sponsor's default together with financial requirements for long-term management of the bank should be explicitly noted in the banking instrument.

E. In the event of default or abandonment, the decision regarding further bank maintenance rests with the Corps or NRCS in consultation with the institution or agency which provides the financial assurances. Available options are terminating the bank and debiting banks located elsewhere or designating a public or private entity to either take over maintenance and continue operation of the bank in accord with initial plans or a scale-down version of the bank. In the latter option, physical implementation might merely be taken to a point which will accommodate already authorized debits, then suspending further operation and maintenance.

The range of remedial actions which are available when bank failure is due to controllable human factors (e.g. faulty hydrology design, poor quality planting stock or planting technique) depends on the time at which failure is detected. If failure is detected prior to debiting, the bank sponsor would have the option of either abandoning the bank or taking action to correct deficiencies. If failure due to controllable conditions occurs after debiting

has taken place and the bank's physical problems jeopardize the existence of the credits that have been debited, authorization for further debiting should be immediately suspended pending remedial measures to correct adverse conditions. Failure to institute remedial measures may result in revocation of permits and, other legal measures to force compliance, including forfeiture of financial assurances. Typically, forfeiture of financial assurance funds would not be affected, in cases where there is a positive balance of credits in the bank and there is minimal ecological risk that those credits will be lessened or lost.

F. Bank sponsors should be required to provide proof of financial responsibility prior to and as a condition to certification of credits.

2. Long-term management and protection

A. Mitigation banks should be managed and maintained in accordance with the terms of the banking instrument for their operational life. The operational life of a mitigation bank is defined as the point at which (1) the bank is determined to be functionally mature and self-sustaining, and (2) compensatory credits have been exhausted, or (3) bank debiting is voluntarily terminated.

B. The types and levels of maintenance activities which are required in a wetland mitigation bank cannot be specified in this guidance document because of the wide natural variation which exists among banks. Suffice it to say that maintenance must be geared to the prevailing physical and biological conditions and must be of a type and level which assures the development of mature and self-sustaining wetlands. One of the functions of the MBRT is to provide bank sponsors with assistance in the identification of long-term maintenance needs together with their funding and logistical requirements. The authorizing agency also continuously evaluates the adequacy of maintenance through the review of monitoring reports and on-site inspections.

C. Mitigation banks should be dedicated to compensatory mitigation purposes in perpetuity unless a shorter time-frame is approved by the MBRT. Legal instruments such as conservation easements, deed restrictions, restrictive covenants, or title transfers may be acceptable mechanisms to provide long-term assurances. Such legal instruments should acknowledge the primary use of bank lands and waters for mitigation purposes and restrict other uses to activities which are compatible with that use. Activities which may not be physically disruptive such as non-intensive outdoor recreation, recreational hunting and fishing, research and nature study are generally regarded as compatible uses. However, activities which are clearly physically disruptive such as surface mining and agricultural cultivation (unless specifically required for wetland management) are generally viewed as incompatible with bank purposes.

3. Types of Financial Assurance

Financial assurances may be in the form of surety bonding, collateral bonding, self bonding, or alternative bonding. A brief description of each is presented below (see Institute for Water Resources, 1995 for more information):

A. Surety Bonding. A surety bond is an indemnity contract in a sum certain whereby a surety agrees to assume the responsibilities for default on the debts or obligations of another party (i.e., the sponsor of the bank). The surety bond is supported by the guarantee of a corporation licensed to business as a surety. Financial responsibility for failure to fulfill its mitigation obligations is assumed by a surety company. There are two types of surety bonds relevant for mitigation banking--payment bonds and performance bonds. A payment bond (sometimes called a financial guarantee bond) is an assurance contract whereby a surety agrees to pay the full face amount of the bond (the penal sum) to the beneficiary if the principal fails to fulfill stated obligations. A

performance bond is an assurance contract whereby a surety agrees either to pay the penal sum of the bond or to perform the principal's obligations in the event that the principal fails to do so.

B. Collateral Bonding. A collateral bond can be defined as an indemnity contract in a sum certain executed by the mitigation banker (as principal) and made payable to regulatory authority (as beneficiary), which is supported by the provision of some form of "security". A security is defined as an obligation, pledge, mortgage, deposit, lien, etc., given by a debtor in order to make sure the payment or performance of his debt, by furnishing the creditor with a resource to be used in case of failure in the principal obligation (*Black's Law Dictionary*). Financial responsibility is retained by the mitigation bank sponsor through the provision of security which would be subject to forfeiture in the event that mitigation obligations were not fulfilled. There are variety of collateral bonding options which vary according to the manner in which security is held and made available to the beneficiary in the event of forfeiture.

- **Letter of Credit**. A letter of credit provides for the extension of the credit of one party, such as a commercial bank or other financial institution (the issuer), on behalf of a second party (mitigation bank sponsor), to a third party (regulatory authority). The issuer allows the beneficiary to draw up to a specified sum of money from the credit account upon demand. Letters of credit are typically stipulated to be irrevocable and issued for at least one year.

- **Security in Escrow**. An escrow is an agreement between two parties, a grantor (mitigation bank sponsor) and a grantee (regulatory authority) , to transfer ownership of certain property (real or personal) from the former to the latter upon some stated condition or event. A neutral third party such as a commercial bank or other financial institution (the depositary) is appointed to receive the property (or deed thereto) and to assure its transfer as specified in the escrow agreement. Legal title to the property remains with the grantor; however, after the property has been properly delivered to the depositary, neither the grantor nor the grantee can obtain it without mutual agreement or in the absence of fulfillment of the terms of the escrow agreement. Various forms of personal property, including cash, certificates of deposit, or marketable U.S. government bonds could be held in an account established at a financial institution accompanied by a written agreement by that institution to pay the regulatory authority upon demand in the event of forfeiture. If the mitigation banker fails to fulfill its obligations, then title to the property held in escrow would pass to the regulatory authority or to an entity designated by the regulatory authority. If, on other hand, the mitigation bank fulfilled its obligations, the property held in escrow would be returned to the mitigation bank sponsor.

- **Security in Trust**. A trust is an arrangement enabling property, real or personal, to be held by one party (trustee/financial institution) for the benefit of another party (beneficiary/ regulatory authority). Unlike an escrow, a trust is a right of property; the trustee becomes the legal owner of the trust property (the "trust deposit"), although the beneficiary has an equitable interest in it. The trust deposit must be kept intact and not commingled with other property of the trustee, and must be devoted exclusively to the particular purposes outlined by the trust agreement. A trust could be structured as an indemnity contract similar to an escrow. Such a trust would stipulate that the trust deposit must be devoted to a particular obligation of the depositor (mitigation bank sponsor) in the event that it is not otherwise fulfilled by the depositor, and returned in kind to the depositor if the obligation is fulfilled. In the event that a mitigation bank sponsor who used real property in trust as assurance option defaulted on its obligation, the trustee would sell the property and provide the proceeds to an entity designated by the regulatory authority. Trust funds have been used to provide long-term management of some mitigation parcel.

- **Other Security Interest**. Security interest in property may also be provided directly by a mitigation banker to an entity designated by the regulatory authority through an indemnity contract structured as a "pledge". The necessary conditions for a contract to constitute a pledge include: 1) possession of the pledged property must pass from the pledgor to the pledgee (though it may only be constructive), 2)

legal title to the property must remain with the pledgor, and 3) the pledgee must have a lien on the property for performance of an obligation due him by the pledgor. In the event that the pledgor defaults on the obligation, the property would be sold and the pledgee would receive only so much of the proceeds that are necessary to perform the pledgor's obligation (Black, 1968). Various forms of personal property could be pledged by mitigation bankers to parties designated by the regulatory authority as security interest. The forms that might be most acceptable to regulators include cash, certificates of deposits, or other cash equivalents (e.g. money orders, certified bank drafts), negotiable U.S. government bonds, investment grade securities (e.g. corporate bonds having a high credit rating), as well as real property either through a pledge or as a mortgage (involves transfer of title). Cash could be deposited directly with the regulatory authority-designated entity, and negotiable certificates of deposit and bonds could be assigned or endorsed to that entity and placed in its possession. Regulators will not want to hold securities provided as assurances. As such, securities can sometimes be held by a financial institution without necessitating the establishment of an escrow account. For example, personal assets held in book entry form at a financial institution can be pledged in favor of the regulatory authority simply by having the financial institution place a notation against the book entry account.

C. Self Bonding. Self bonding is an indemnity agreement in a sum certain executed by the regulated party (mitigation banker), or by the regulated party and a corporate guarantor (a parent or non-parent company), and made payable to an entity designated by the regulatory authority. Unlike surety or collateral bonds, self bonds are not supported by the guarantee of a licensed surety nor by security interest. In the context of mitigation banking, self bonding would allow a mitigation bank sponsor (or its guarantor) to guarantee performance without incurring any cost until the regulatory authority determined that the bank had defaulted on its obligations. In that event, the banker (or his guarantor) would be liable to fulfill the terms of the indemnity agreement, either through the performance of the obligation or through the payment of a specified sum of money to an entity designated by the regulator to fulfill the terms. In some environmental contexts, self bonding is allowed provided that the regulated party or its guarantor meets certain financial tests.

D. Alternative Financial Assurance Mechanisms. Various other assurance options may be potentially applicable to the mitigation banking context. For example, a "bond/assurance pool" whereby the regulatory authority acts much like an insurance company to pool risks across a portfolio of mitigation banks in a given watershed or region may be workable for mitigation banking. In the Surface Mine Control and Reclamation Act (SMCRA) bonding context, for example, a number of states have been given approval to develop such alternative assurance systems which generally include two components: 1) a flat (or sliding scale) rate per acre bond, and 2) a supplemental state reclamation fund capitalized with permit fees, taxes on mine production, and monetary penalties paid by operators. When an operator defaults on his permit obligations, the flat rate bond amount is applied first to recover site reclamation costs incurred by the regulatory authority, and the supplemental fund is used to make up any shortfall (see: McElfish and Beier, 1990). Such an assurance alterative could in principal also be used in the mitigation banking context (See IWR, 1995). For example, the regulatory authority may allow mitigation banks to post financial assurance using one of the methods described above, set at a fixed dollar rate per acre or at a rate which sets individual assurances at some percentage of bank-specific mitigation costs. A supplemental mitigation trust fund could then be established by an entity designated by the regulatory authority and funded with a one-time, non-refundable bank permit fee applied to each bank, as well as a taxes imposed on each credit sold. The supplemental fund would then be used by designee of the regulatory authority, as needed, to repair or replace mitigation sites when the assurance monies posted by the individual banks were insufficient to cover bank-specific mitigation costs.

4. Selection of Appropriate Assurance Mechanisms

Selection of the type of financial assurance as the collateral occurs after careful review and analysis by the Corps or NRCS legal staff. Preliminary assessment, however, should consider reliability and availability of an

assurance option without the administrative burden to the regulatory authority. In addition, consideration should be given to implementation cost and the degree that the financial assurance mechanism provides an incentive for the sponsor to fulfill the mitigation requirements. For example, letters of credit meet the criteria for availability, reliability, low implementation cost to sponsors while providing a strong incentive to fulfill mitigation obligations, and low administrative burden to the regulators (See IWR, 1995).

5. Overarching Issues for Financial Assurances

There are numerous factors to be considered by regulators in determining the need for and the nature and amount of financial assurances. A significant problem in requiring financial assurance, such as in the form of a bond, is the Miscellaneous Receipts Statute which requires that certain Federal funds be returned to the U.S. Treasury in lieu of being used to augment a Federal agency's appropriations for specific projects. Basically, unless there is a specific statutory provision that allows the Corps to take money from a bonding agreement and use that money for a specific project, money received by Corps officials must be deposited into the General Fund of the U.S. Treasury.

To avoid the application of the Miscellaneous Receipts Statute, Corps field offices, in many cases, have used a third party to effect the required mitigation with the funds collected from the bond. If the funds placed in surety were ever to be collected, then that third party group (e.g., an interested, trustworthy, and financially secure group) would receive those funds and presumably complete the mitigation work at a particular permit site—at the bank. By using this method, the dedicated funds are never passed into the hands of the U.S. Government. Regulators are cautioned to use care in determining whether to use a third party and which third party to use, if that method is selected.

If the Corps were to require a surety agreement from a permit applicant, and that applicant were eventually to default on obligations under that permit (e.g., declare bankruptcy, refuse to complete required mitigation, etc.), the third party would be responsible for collecting the dedicated funds secured by the surety agreement and seeing that the work necessary to complete any outstanding permit conditions not completed by the permittee is performed.

6. Amount of Financial Assurance

The amount of financial assurance should be sufficient to complete the bank's construction, planting, maintenance, and monitoring during the operational life for credits that have been certified. Since implementation costs vary with type of mitigation banks, the amount of financial assurance necessary for remedial actions is determined on a case-by-case basis. The amount may be based on the worst-case assumption of cost, that is if the regulatory agency or its contractor would assume to complete the mitigation plan in addition to its administrative cost. Three potential scenarios may be encountered for mitigation banks. In the first case, credits may be certified for sale when construction activities have not been initiated. In this case, the amount of financial assurance required by the sponsor would be the cost of construction, planting, maintenance and monitoring activities. The second scenario may be that credits are certified after construction and planting have been completed, however, success criteria have not yet been achieved. The amount of financial assurance in this case would be based on the cost of completing the design plans, cost of maintenance and monitoring of the mitigation bank during its operational life, and any additional costs determined to be needed if any portion of the work would need to be repeated. The last scenario involves certification of credits after the design plan is implemented and the credits have achieved the success criteria. In this case the amount of financial assurance would be cost of maintenance and monitoring of credits during the life of the bank.

As discussed earlier, cost of long-term maintenance may also be included in the amount of financial assurance. Cost of long-term maintenance also vary among mitigation banks. While some banks require regular maintenance activities such as removal of accumulated sediment, or maintenance of support structures such as irrigation structures, others may only need adequate funds for activities such as removal of non-native vegetation and pest control. A small percentage of the assurance amount for each credit sold may be set aside to be used for long-term maintenance. The long-term maintenance cost and the legal title of the mitigation site may be transferred to a resource agency or a non-profit organization for this purpose.

7. Release of Financial Assurance

The MBRT may conduct site visits to evaluate the conditions of the credits in the mitigation bank and compare them with the established performance standards or success criteria. The construction and planting portion of the financial assurance may be released upon approval by the Corps or NRCS specified as per conditions specified in the banking instrument. In some cases, as per the banking instrument, portions of the financial assurance funds may be released to the bank sponsor commensurate to achievement of performance standards. The portion of funds for maintenance and monitoring of the bank would be released at the end of the operational life of the mitigation bank. The long-term maintenance costs would remain with the entity designated responsible for maintaining the mitigation bank in perpetuity.

If during the compliance visits the MBRT determines the mitigation bank is operating in deficit (conditions of the bank has deteriorated), use of the bank is immediately ceased, remedial actions are recommended. If remedial actions are not implemented, or the bank is abandoned, total amount of financial assurance is forfeited in addition to other legal measures as allowed by the regulatory authority of the permitting agency. The regulatory agency may then designate a public or private non-profit entity or obtain the services of a contractor to implement the necessary remedial activities.

References

Black, Henry. 1980. Blacks Law Dictionary. Revised Fourth Edition. West Publishing Company. St. Paul, Minnesota

Institute for Water Resources. 1995. Implementing Financial Assurance Requirements for Commercial Wetland Mitigation Banking. Working Paper prepared by Paul Scodari, August, 40 pp.

McElfish, James and A. Beier. 1990. Environmental Regulation of Coal Mining. Environmental Law Institute, Washington, D.C., April.

GLOSSARY OF TERMS

Banking instrument - a written document which contains specifications pertaining to establishment, operation, and maintenance of a mitigation bank and which describes the responsibilities of the bank sponsor and signatory parties as appropriate. A common type of banking instrument is an interagency agreement (e.g., Memorandum of Agreement or Memorandum of Understanding). In cases where a Department of the Army permit is required for establishment of a mitigation bank, the banking instrument will be made part of the permit.

Baseline - Physical and functional conditions of an area which are expected to exist over time in the absence of a bank. Baseline is also commonly referred to as the "without project condition".

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

Compensation ratio - the rate at which credits must be withdrawn (i.e., debited) from a bank in order to provide for satisfactory compensation of unavoidable wetland losses. Compensation ratios are based on various factors, including the intrinsic similarities and differences in functions and values which exist between the respective wetland areas, probability of successful compensation, locational, temporal, and other determining factors.

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

Credit - a unit of measure representing the accrual or attainment of aquatic functions at a mitigation bank; the measure of function is typically indexed to the number of wetland acres restored, created, enhanced, or preserved.

Credit production - the establishment of compensatory wetland credits by the preservation or enhancement of existing wetlands, the restoration of former or degraded wetlands, or the creation of wetlands on non-wetland sites.

Debit - a unit measure representing the loss of aquatic functions at an impact or project site.

Debiting - a mitigation action involving the use of compensatory credits in a bank to replace the functions and values of a wetland area which is lost or degraded by permitted construction or agricultural conversion. Authorization to debit a bank is the responsibility of the Corps of Engineers or the Natural Resources Conservation Service.

Debiting wetland - a wetland area which has been or will be adversely impacted by permitted construction or agricultural conversion, the compensation of which is to be accomplished by debiting a mitigation bank.

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

Function - any of a number of physical or biological processes which take place in wetland areas. Commonly recognized functions are food chain production, provision of fish and wildlife habitat, shoreline protection, storm and floodwater storage, groundwater recharge and discharge, and water purification.

Functional maturity - a condition whereby restored, enhanced or created wetlands in a wetland mitigation bank have acquired physical and ecological characteristics which are normal to the wetland type and region in which the bank is located.

Hydrologic unit - a geographic area possessing common surface drainage characteristics. Specific hydrologic units referred to in this guidance are those depicted on the U.S. Geological Survey's Hydrological Unit Map of the United Stated, 1980 and are (from smallest to largest area) Cataloging Unit, Accounting Unit, and Hydrologic Subregion.

In-kind replacement - compensation of wetland losses involving replacement of a wetland area by restoring, enhancing, creating, or preserving a wetland area of the same physical and functional type.

Mitigation - For purposes of Section 10/404 and consistent with the Council of Environmental Quality Regulations, the Section 404(b)(1) Guidelines and the Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404 (b)(1) Guidelines, mitigation means sequentially avoiding impacts, minimizing impacts, and compensating for remaining unavoidable impacts.

Mitigation bank - a site where wetlands and/or other aquatic resources are restored, created, enhanced, or in exceptional circumstances, preserved expressly for providing compensatory mitigation for more than one project's impact in advance of authorized unavoidable impacts to similar resources.

Mitigation bank review team (MBRT) - An interagency group of Federal, state, tribal and/or local regulatory and resource agency representatives which are signatory to a banking instrument and oversee the establishment, use and operation of a mitigation bank.

Operational life - the duration of time in which a bank is actively managed. Operational life ceases when bank wetlands attain functional maturity or are self-sustaining and all credits are either withdrawn or use of the bank is voluntarily terminated.

Out-of-kind replacement - compensation that involves replacement of a wetland area by restoring, enhancing, creating or preserving another wetland area of a different physical and functional type.

Preservation - protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection and/or enhancement of the aquatic ecosystem.

Private-commercial (entrepreneurial) banks - a privately sponsored mitigation banks which makes wetland credits available for sale to third parties on the open market. This type of bank is frequently referred to as an "entrepreneurial bank".

Prospectus - a preliminary plan for a mitigation bank prepared by a prospective sponsor and submitted for review and approval by the MBRT.

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

Service area - a geographic area (e.g., watershed, county) wherein a bank can reasonably be expected to provide appropriate compensation for impacts to wetlands and/or other aquatic resources.

Single-client bank - a bank which is sponsored by a public or private entity principally for the compensation of unavoidable wetland losses caused by its own developmental activities, e.g., a state highway department. port authority, oil exploration company. While, by definition, such banks normally involve single users, occasionally excess credits can be made available for use by others for compensation purposes.

Sponsor - an individual or entity who establishes a wetland mitigation bank. Sponsors are of three basic types: 1. those who create a bank to compensate wetland losses for which they are directly responsible (i.e., a single-client bank); 2. a public entity that produces credits for general use by public and private interests (i.e., public commercial bank), and (3) those with a proprietary interest in the commercial sale of compensation credits to other private or public entities (i.e., private-commercial (entrepreneurial bank).

Success - accomplishment of wetland restoration, enhancement, creation, or preservation in accordance with bank objectives, design specifications, or success criteria.

Watershed - A geographic area possessing a common surface drainage. Examples of watersheds used in this guidance are Cataloging Unit, Accounting Unit and Hydrologic Subregion as depicted on the Hydrologic Unit Map of the United States, U.S. Geological Survey, 1980.

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

ATTACHMENT

TYPES OF WETLAND MITIGATION BANKS

This attachment identifies the basic types of wetland mitigation banks according to the nature of their sponsorship and clientele. Four categories of banks are recognized.

Single-client banks. In these banks, the sponsor (e.g., the individual or entity who initiates the bank and produces its credits) is also the principal credit user or client. An example of this category is the many highway related banks which have been established by state departments of transportation and highways for the principal purposes of compensating for wetland losses attributed to their own construction activities. Another prominent example of the single client bank are those sponsored by port authorities.

Joint-project banks. The objective of this type of bank is to compensate the wetland losses attributed to the construction activities of two more public agencies or combinations of public and private agencies. The pooling of resources provides for the more efficient production of compensation credits than would be possible separately and also allows wetland management efforts to be better coordinated with local and regional land use plans.

Public-commercial (general use) banks. The objective of this type of bank is the compensation of wetland losses caused by a broad range of construction activity taking place within a particular area, usually in accordance with a general plan of development. The area is typically urban. Public-commercial (general use) banks are usually sponsored by public entities for compensation of wetland losses caused by a combination of public works projects and private development.

Private-commercial (entrepreneurial) banks. These are sponsored by private entrepreneurs with the purpose of making compensatory credits available for sale on the open market. The market (or clients) for such credits may include public or private interests.

Banks have varying modes of operation. The following are examples.

Debit banks. The objective of these banks is the production of wetland credits and the expressed maintenance of positive credit balances which are then incrementally withdrawn for the compensation of piecemeal wetland losses. Because these banks have the defining characteristic of intentionally "banked" credits, they fit the textbook definition of banking and are frequently referred to as classic or *a priori* banks.

Zero-balance banks. This category of banks provide for the piecemeal compensation of wetland losses on a more or less "pay-as-you-go basis" through the equally piecemeal production of credits. The initial intention of such arrangements is the compensation of individual wetland losses as the losses take place; however, such compensation typically takes place within a discrete area. In such banks, the advanced production of a large block of compensation credits does not take place and therefore, credits are not intentionally "banked." However, wetland management efforts which happen to be in excess of instant mitigation needs often **inadvertently** result in positive credit balances which are then "maintained on the books" as they are in *a priori* banks for the compensation of future wetland losses.

Accounting systems. The basic objective of these systems is to maintain running accounts of all wetland losses due to developmental and agricultural activities and to all wetland gains resulting from wetland restoration and creation projects taking place within a discrete area, normally on a statewide basis.