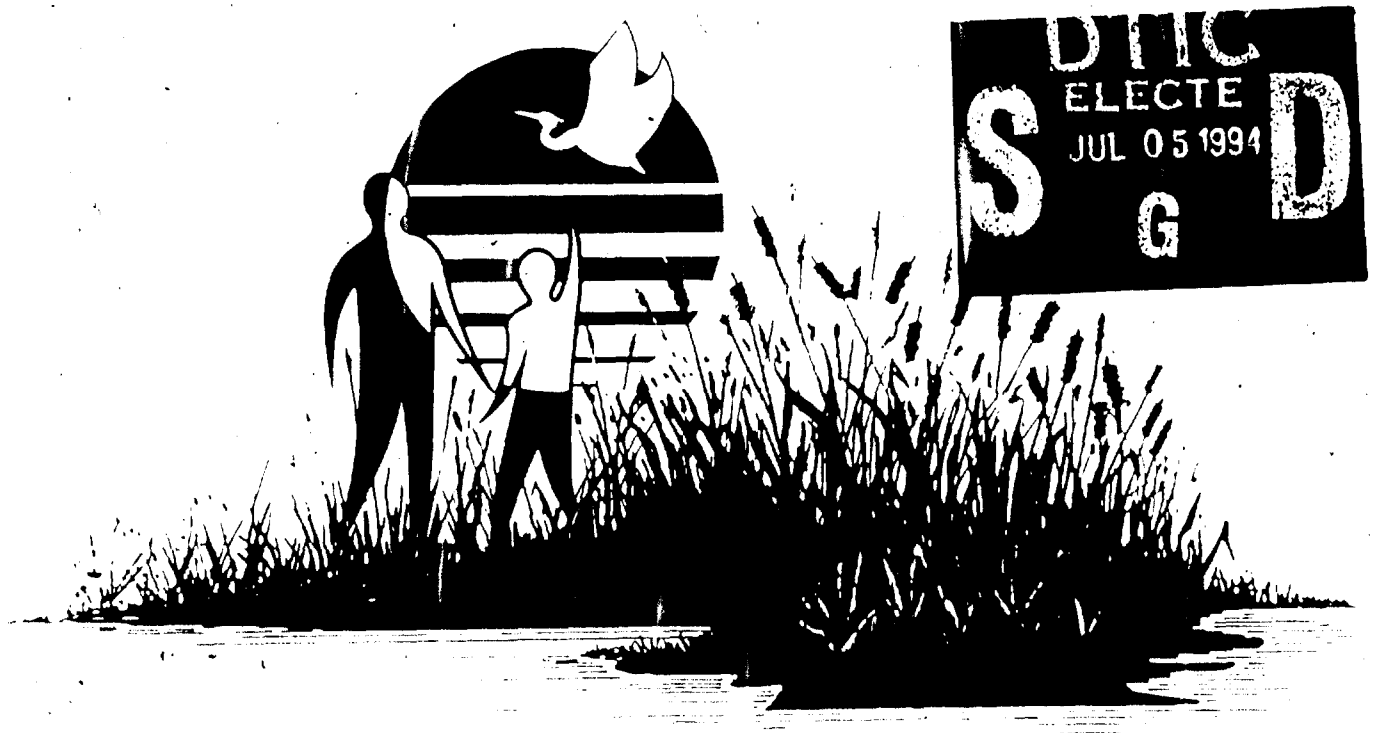
US Army Corps of Engineers
Water Resources Support Center
Institute for Water Resources

WETLANDS MITIGATION BANKING CONCEPTS



WETLANDS MITIGATION BANKING DEMONSTRATION STUDY

July 1992

IWR Report 92-WMB-1

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1992	

4. TITLE AND SUBTITLE
Wetlands Mitigation Banking Concepts

5. FUNDING NUMBERS

6. AUTHOR(S)
Reppert, Richard

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
USACE, Water Resources Support Center
Institute for Water Resources
Policy Division
Casey Building
Ft. Belvoir, VA 22060-5586

8. PERFORMING ORGANIZATION REPORT NUMBER
IWR Report 92-WMB-1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
USACE, Headquarters
Directorate of Civil Works
20 Massachusetts AVe., NW
Washington, DC 20314-1000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The report summarizes information on Wetlands Mitigation Banking (WMB). The report discusses variation in types of banks, the national perspective, issues associated with banking, and on evaluation of WMBs to date.

This report is an initial product of a Wetlands Mitigation Banking Demonstration Study being conducted by the U.S. Army Corps of Engineers, Institute for Water Resources. This report briefly describes that study.

14. SUBJECT TERMS
Wetlands Mitigation Banking (WMB), concepts, application, legal basis, type, national perspective, pros and cons.

15. NUMBER OF PAGES
33

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

WETLANDS MITIGATION BANKING CONCEPTS

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Preface

This paper provides general background information pertaining to wetlands mitigation banking. It is one of the initial products of a Wetlands Mitigation Banking Demonstration Study being conducted by the U.S. Army Engineer Institute for Water Resources, Casey Building, Fort Belvoir, VA 22060-5586

The authority for the Wetlands Mitigation Banking Demonstration Study is Section 307(d) of the Water Resources Development Act of 1990. The purpose of the study is to comprehensively review and evaluate wetlands mitigation banking, to determine its potential for achieving established national wetland goals, to determine its applicability to Corps of Engineers programs, to develop general guidance on the establishment and operation of wetland mitigation banks, and to formulate a demonstration program for potential implementation by the Corps of Engineers.

The study, which began in December 1991, is a two phase effort, each about 15 months duration. The first phase is being devoted to (1) critical review and evaluation of banks by means of case studies, coordination with others and literature research, (2) analysis of technical and policy issues, (3) assessment of crediting and debiting methods and (4) determination of the feasibility of a wetlands mitigation banking demonstration program together with identification of potential demonstration sites.

Assuming the feasibility of proceeding with a demonstration program, the second phase of the study will involve (1) detailed planning and design of demonstration sites, (2) assistance in the preparation of Corps of Engineers policy and guidance pertaining to wetlands mitigation banking, (3) preparation of an Implementation Manual providing detailed procedural and technical guidance on the establishment and operation of banks for the benefit of potential public and private sponsors and Corps of Engineers field personnel, and (4) preparation of a final report to the Congress.

This concept paper was prepared under the direct supervision of Dr. Eugene Z. Stakhiv, Chief, Policy and Special Studies Division, Institute for Water Resources. Kyle E. Schilling is Director of the Institute.

For further information about the Wetlands Mitigation Banking Demonstration Study, please contact the study manager, Dr. Robert Brumbaugh, Policy and Special Studies Division, Institute for Water Resources, Fort Belvoir, VA at (703)355-3069.

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a. Definition of the concept

Wetlands mitigation banking is a relatively new natural resource management concept which provides for the advanced compensation of unavoidable wetland losses due to developmental activities. Mitigation banking can be achieved through the creation, restoration, enhancement or preservation of other wetland areas of equivalent value generally located outside the immediate area of wetlands loss or alteration.

Wetland mitigation banks are normally relatively large blocks of wetlands whose estimated tangible and intangible values, termed credits, are similar to cash deposits in a regular checking account. As anticipated development takes place, credits equivalent to the estimated unavoidable wetland losses are withdrawn or debited from the bank to compensate for the losses incurred. As development continues over time, the credits of banks, which are qualitatively similar and scaled in size to the magnitude of anticipated wetlands losses, are progressively exhausted. When credits are reduced to zero, further mitigation must then be effected by other means or through establishment of new banks.

The objective in wetlands mitigation banking is to replace the physical and biological functions and human-use values of the wetlands which are unavoidably lost due to development. The estimation of wetland losses (debits) and the estimation of the credits contained within banks are determined using both analytical and non-analytical methods. Analytical methods are functionally based and vary in their degree of comprehensiveness. Fish and wildlife habitat values traditionally are estimated through habitat-based methods such as the Habitat Evaluation Procedures (HEP) developed by the U.S. Fish and Wildlife Service (USFWS, 1980). In these cases the debits and credits are listed in terms of habitat units for the particular evaluation species used in the analysis, and compensatory replacements are made on the same basis.

The more comprehensive valuation of wetlands necessitates the use of analytical methods capable of quantifying broader arrays of physical and biological functions for which wetlands are noted. One such method is the Wetland Evaluation Technique (WET) (Adamus, 1987).

However, the methodology which is most commonly used for valuation and accounting purposes is a non-analytical (and non-functional) one which merely tabulates credits and debits according to acreage of various wetland types. Using this method, compensatory mitigation is effected merely by replacing wetland types lost with wetland types contained in a bank on an acreage basis.

Regardless of the valuation methods used, compensatory mitigation in banks may or may not entail acre for acre in-kind replacement of wetlands. It could entail replacement with more or less acreage of different wetland types depending on the unit valuation of the wetlands lost compared to the unit valuation of the wetlands located in the bank.

b. Application

Wetlands mitigation banking is most amenable for the compensation of relatively small wetlands losses caused by repetitive types of construction activity in which piecemeal losses may be minor but cumulative losses over time may be substantial. By virtue of their small size and usual location within established arenas of development, such losses may not be feasible to mitigate on-site. In view of these circumstances, the greatest potential for wetlands mitigation banking is in the regulatory program.

Two of the most important advantages of mitigation banking are that it (1) allows the consolidation of such losses and their compensation *en bloc* in a specially designated and managed area off site, and (2) normally provides for their compensation before the fact, i.e. before the wetland losses actually take place.

Wetland mitigation banks established to date are heavily associated with highway construction and port development, both of which entail the piecemeal loss or damage to wetland resources which are commonly infeasible to mitigate on site. State highway departments and port authorities have been the principal sponsors of banks in these instances.

c. Legal basis

The principal legal bases for the mitigation of wetland losses, at least from a national perspective are

(1) The Fish and Wildlife Coordination Act of 1958 (FWCA),

(2) Section 404 of the Clean Water Act (CWA) and the Section 404(b)(1) Guidelines promulgated by the Environmental Protection Agency, and

(3) Executive Order 11990, Protection of wetlands.

The FWCA provides an opportunity for the U.S. Fish and Wildlife Service, National Marine Fisheries Service and the head of the applicable state fish and wildlife agencies to comment on Corps of Engineers water resource development projects and on Department of the Army permits applied for under Section 10 of the River and Harbor Act of 1899 and Section 404 of the CWA. Further, the FWCA requires the Corps to consider specific recommendations for the mitigation of fish and wildlife habitat losses made by these agencies for potential adoption as part of federal water resource projects or as conditions in the issuance of Department of the Army permits.

Most of the banks implemented to date have been in response to initiatives developed under the FWCA and have involved construction projects developed under Corps of Engineers permit authorities. Historically, arrangements for the establishment of banks have been worked out by negotiation between federal and state fish and wildlife agencies and prospective bank sponsors. Normally these negotiations culminate in an MOA (Memorandum of Agreement) to which all principals are signatory. In many of these cases there has been little direct Corps involvement in the formative stages of banks; however, once established, the tendency has been for the Corps to accept the debiting and crediting arrangements recommended by the agencies in its review of individual permit applications and to adopt these for compensatory mitigation purposes.

Several active banks have been developed through an alternate procedure in which specifications pertaining to establishment, maintenance and operation are cited as special conditions in permits issued directly to bank sponsors rather than in the form of an MOA.

In such cases the Corps of Engineers has, of course, been actively involved in planning aspects.

The EPA Section 404(b)(1) Guidelines establish specific environmental criteria which must be met for activities to be permitted under Section 404 and hence provide a more definitive basis for the mitigation of wetland losses than the FWCA. A 1990 Memorandum of Agreement (MOA) between EPA and the Corps articulates specific policy and procedures concerning the determination of mitigation under the Section 404(b)(1) Guidelines. The MOA recognizes that mitigation banking may be an acceptable form of compensatory mitigation under specific criteria designed to assure that the banks meet their environmental objectives.

Quite aside from the authority which is used for their establishment, the actual debiting of banks to compensate for anticipated losses from individual construction activities is still subject to the sequencing provisions of the Corps' permit review procedures. Thus, as a rule, debiting is only allowed

(1) following the determination that wetland losses cannot be avoided,

(2) following efforts to minimize wetland losses through modification of construction plans and designs, and

(3) following a determination that it is not feasible to mitigate losses onsite.

d. Variations in type

This discussion concerns the varied classification, mode of sponsorship, funding and operation which characterizes banks. Sponsorship of existing banks runs the gamut from those established by industrial firms, individual entrepreneurs, public agencies such as state highway departments, quasi-public entities such as port authorities, and federal agencies. In general, banks fit into two categories: (1) dedicated banks, whose principal objectives are the compensation of wetland losses associated with discrete types of construction activity and which by and large are sponsored by single construction entities, and (2) commercial banks, which are established by private entrepreneurs and whose wetland credits are available for purchase on the open market by miscellaneous construction entities whose activities require the compensation of wetland losses.

(1) Industrial banks. One of the earliest banks was sponsored by a private corporation known as Tenneco LaTerre, for the purpose of mitigating in advance for piecemeal wetland losses resulting from its oil and gas exploration activities in the Louisiana coastal marshes. (Sometime following establishment of the bank, Tenneco LaTerre's holdings were acquired by another firm and it is now known as Fina LaTerre). In the case of Fina la Terre the bank is entirely proprietary in nature; it is located on company lands, with implementation of initial marsh restoration measures and continued operation by the company (Soileau, 1984 and Dell, 1991).

(2) Highway-related banks. In the case of banks established to mitigate wetland losses due to highway construction, the state highway departments normally act as the sponsoring entities and provide funding for their initial establishment and operation. In most cases, however, actual operation is carried out by an expert state natural resource agency operating under agreement with the highway department in question, usually with transfer of title to the lands as well.

Until recently the Federal Highway Administration was not authorized to fund the mitigation of wetland losses outside of the immediate highway right-of-way (highway

related banks are the predominant type in spite of this limitation). However, with passage of the Intermodal Surface Transportation Efficiency Act of 1991, banks are now classified as highway projects in themselves, thereby making them eligible for federal funding support. This funding authority should greatly enhance the establishment of banks for highway development purposes.

(3) Port-related banks. Banks established to mitigate wetland losses associated with port development take essentially the same form. In the case of most of the larger commercial ports the port authorities serve as bank sponsors and fund their establishment and operation. However, in the case of certain smaller, less commercially developed ports, sponsorship and funding is sometimes carried out by lessees or groups of lessees operating within the ports.

Unlike state highway departments which bear the ultimate cost of bank establishment, maintenance and operation, port authorities are in a position to recover some or all of their costs by passing them down to port users in the form of port user fees, land rents and the like.

(4) Federal project banks. To date, there are few known instances of mitigation banks associated with federal water resource development programs or projects. One project-level bank was established by the Bureau of Reclamation (Burec) in cooperation with the Utah Division of Wildlife Resources in order to compensate for losses of wildlife habitat in conjunction with construction of the Bonneville Unit of Burec's Central Utah project. Although wetlands were not involved in this case, the fact that it was a successful operation allows it to serve as a useful analog.

The Passaic River flood control project in New Jersey and New York, authorized for construction by the Corps of Engineers in the Water Resources Development Act of 1990, is the only known example of a bank involving a Corps of Engineers project. A non-structural flood control component of that project, entailing the acquisition of large acreages of freshwater wetlands within the State of New Jersey which have a natural flood detention capability, has been termed a "Wetlands Bank" in the authorizing legislation. The purpose of the wetlands bank is not only to compensate for wetlands losses caused elsewhere in the Passaic River basin by the project's structural flood control features, but also to mitigate for wetland losses due to **non-federal** activities carried out throughout the state of New Jersey. In the authorizing legislation the State of New Jersey is charged with the responsibility for actual implementation and operation of the wetlands bank.

In the case of the Passaic, the wetlands credits are now principally in the form of preservation credits due to the threatened nature of the wetlands in question. However, many of the wetlands are presently degraded and provide a potential for accumulating additional mitigation credits through restorative efforts. The Passaic River project is now in the Preconstruction Planning and Design stage.

(5) Commercial banks and the sale and purchase of wetland credits. A recent inventory of banks has identified one commercial bank in active operation in California and others in planning in Georgia, New Jersey and Texas. It appears that entrepreneurial interests are becoming increasingly aware of the profitability of wetlands restoration, creation and enhancement and the associated sale of compensatory credits.

On 9 August 1991 the President announced a comprehensive plan for the protection of the nation's wetlands which includes interest in development of a "market-oriented" mitigation banking system for regulatory purposes. Under such a system, private developers would be

provided incentives to restore or create wetlands as the basis for mitigation credits which in turn can be sold or traded to developers in order to satisfy their compensatory mitigation requirements. The exact form these incentives might take is not yet known. The system, which would be based on wetland categories to be defined by an interagency technical committee, would presume satisfaction of permit conditions if the mitigation credits are from the same or higher wetland category.

It should also be noted that the MOA's of several dedicated banks contain provisions which permit their sponsors to sell excess credits which are excess to their needs on the open market. Presumably these provisions have been included in the interest of cost recovery.

(6) Wetlands mitigation trusts. Another form of mitigation involving the cash purchase of wetland credits by developers is the so-called **wetlands trust fund** concept. Under this concept developers make cash contributions to a trust fund maintained by a local, state or federal entity in order to cover the wetland losses for which they are responsible. Accumulated monies are then used to provide replacement wetland areas for mitigation purposes after the fact.

Five wetland mitigation trusts are known to exist at present, in Maryland, Louisiana, California, Oregon and Hawaii.

Because this form of mitigation does not provide for the advanced or pre-planned compensation of wetland losses, wetlands mitigation trusts do not fit the precise definition of wetlands mitigation banking. However, the fact that they do provide for the consolidation of small wetland mitigation requirements associated with repetitive-type activities using the same wetlands management techniques gives them much in common with banks. The distinctions which exist between wetlands mitigation trusts and banks appear important to environmental interests. However, developmental interests perceive little difference between the two.

e. The national perspective

A growing national interest in wetlands mitigation banking is evident. The National Wetlands Policy Forum (NWPF), whose November 15, 1988 report, **Protecting America's Wetlands - An Action Agenda** (Conservation Foundation, 1988), first proposed the national goal of no net loss of wetlands, specifically advocated the establishment of banks to which permittees could contribute in order to satisfy wetlands compensation requirements (emphasis added - the language used in the NWPF document seems to suggest that wetlands mitigation banking is viewed as having limited applicability to regulated activities).

The national wetlands goal and recommendations of the NWPF have been enhanced in stature by presidential support, and a wetlands task force within the Domestic Policy Council is charged to develop administrative policies geared to their implementation. The task force includes wetlands mitigation banking within its purview including developing the concept of market-oriented banks noted above.

Several federal agencies with key roles in the management and regulation of wetlands have already embraced wetlands mitigation banking and embodied it in their policies and programs. Shortly after the President lent his support to the NWPF recommendations, the Chief of Engineers forwarded to the Assistant Secretary of the Army (Civil Works) a proposed strategy with which to achieve the national wetland goal, including investigating

the potential applicability of wetlands mitigation banking to Corps projects.

Later, a potential regulatory role for wetlands mitigation banking was foreseen. The 6 February 1990 MOA between the Corps and EPA for determination of mitigation under the Section 404(b)(1) Guidelines acknowledges that banks may be an acceptable form of compensatory mitigation and commits the agencies to the development of additional guidance.

Other agencies have gotten seriously involved in wetlands mitigation banking as well. As noted previously, the U.S. Fish and Wildlife Service contributed to the initial development of wetlands mitigation banking in the early 1980's. Although falling short of absolute endorsement, the USFWS in a 1990 policy statement advocated its investigation, together with fee mitigation, as alternative wetland mitigation strategies (U.S. Fish and Wildlife Service, 1990). The FHWA (Federal Highway Administration) also has a long-standing policy toward wetlands mitigation banking, and with over half of the existing banks nationwide devoted to the mitigation of highway construction damages to wetlands, the effectiveness of their policies cannot be disputed.

SCS (Soil Conservation Service) policies pertaining to wetlands mitigation relate mainly to the "Swampbuster" program (i.e the wetlands conservation provisions of the Food Security Act of 1985). These policies permit the mitigation of wetland agricultural conversion through the creation, restoration and maintenance of other wetlands of equivalent value with the proviso that the banks are established and maintained without direct federal assistance. Other operational limitations also apply. To date only one bank has been established (in North Dakota), and that bank is not operative because it does not meet rigorous conditions imposed by SCS.

SCS representatives feel that Swampbuster does not present conditions which are conducive to wetland mitigation banking inasmuch as its basic purpose is to protect existing wetlands from drainage. The best potential for SCS application is thought to be in conjunction with projects developed under its Watershed Protection and Conservation (PL 566) Program, although historically mitigation in small watershed type projects has been effected on-site on a project by project basis.

Wetlands mitigation banking has caught the attention of Congress, too. The Water Resources Development Act of 1990 (WRDA 90) is the basic authority for this study. Also, various bills under consideration in the 102nd Congress pertaining to reauthorization of the Clean Water Act contain provisions relating to wetlands mitigation banking and bank demonstration programs. As previously mentioned, the recently enacted Intermodal Transportation Efficiency Act of 1991 now provides funding support for the establishment of banks in conjunction with federal aid highways. While the SCS has no specific authorizations pertaining to wetlands mitigation banking, the legislative history of the 1990 amendments to the Food Security Act do contain references to the concept which have allowed the promulgation of relevant policies by that agency (7 CFR 12.5).

2. Evaluation of Wetlands Mitigation Banking to Date

a. Inventory and sponsorship

A preliminary inventory of banks compiled by the U.S. Army Corps of Engineers Institute for Water Resources has identified 37 banks in active operation and another 64 in various stages of planning. Of the 37 active banks, 19 are sponsored by state highway departments, 8 involve port development, 7 involve general land development, 1 involves agricultural drainage, 1 involves mining operations and 1 involves oil and gas activity. In addition, 5 active wetland trusts have been identified.

Given the fact that a 1988 survey of banks conducted by the U.S. Fish and Wildlife Service (Short, 1988) identified only 12 banks in which that agency was actively involved at the time, it appears that the number of banks has more than tripled in the space of only 4 years.

Tables 1 and 2 and Figures 1 and 2 list and locate active and planned banks.

b. The pros and cons of wetlands mitigation banking

Owing to the relative newness of the concept, little information concerning the performance record of banks is available. Undoubtedly the best work available on this subject is that by Short (1988), which provides detailed evaluations of the 12 active banks with which the USFWS had an involvement up to that time.

This analysis of wetlands mitigation banking relies heavily upon the USFWS study, with supplementary information obtained through informal contact with Corps of Engineers headquarters, field and laboratory personnel; the U.S. Fish and Wildlife Service; Soil Conservation Service; Environmental Protection Agency; Federal Highway Administration; the American Association of Port Authorities; the American Association of State Highway and Transportation Officials; and the Association of State Wetland Managers. Of necessity, this review is largely confined to regulatory banks which are by far the predominant type.

To summarize, the perceived track record for banks depends on the particular interest and viewpoints of those involved. Permittees and both individual and institutional bank sponsors generally give them high marks because of the degree of efficiency and predictability they bring to the permit review process. Federal and state agencies generally share this belief once banks are established and operating. However, many of these agencies are critical of the time and aggravation which the development of wetland mitigation banking agreements sometimes entails.

The USFWS and state fish and wildlife agencies tend to have mixed feelings toward banks. While tending to agree that the concept makes for the establishment of larger, more easily managed and generally more valuable wetland units than is possible with piecemeal mitigation efforts, they are aware of serious limitations. Chief among these is the concern that wetlands restoration and creation efforts (upon which wetland mitigation credits are initially based) have not been uniformly successful and in some cases have had negative

Table 1. EXISTING WETLAND MITIGATION BANKS, Institute for Water Resources Preliminary Survey Data, June 1992

NAME OF BANK	LOCATION	ACTIVITY	SPONSOR
Goose Creek/Bowers Hill Tidal Mitigation Bank	VA, Suffolk Co.	highways	Virginia DOT
Cabin Creek WMB	VA, Prince George Co.	highways	Virginia DOT
Fort Lee WMB	VA, Prince George Co.	highways	Virginia DOT
Greensville Co. Palustrine Wetland Bank	VA, Greensville Co.	highways	Virginia DOT
Company Swamp	NC, Bertie Co.	highways	North Carolina DOT
Pridgen Flats	NC, Sampson Co.	highways	North Carolina DOT
Port of Pascagoula SAMP	MS, Jackson Co.	port development, long-term maintenance disposal plan	Miss. Bur. of Marine Resources
MS State Highway Department, Dahomey Natl Wildlife Refuge	MS, Bolivar Co.	highways	Miss. State Highway Departmen
MS State Highway Department, State Line & Dead Dog Pitcher Plant Bogs	MS, Greene Co	highways	Miss. State Highway Department
MS St Hwy Dept, Malmaison Wildl Mgmt Area	MS, Grenada Co.	highways	Miss. State Highway Department
Fina LaTerre Mitigation Bank	LA, Terrebonne Parish	oil & gas exploration & other unspecified activities	Fina-LaTerre
Louisiana DOTD Mitigation Bank	LA, Grant & LaSalle Parishes	highways & public works projects	Louisiana DOT
Patrick Lake	WI, Dane Co.	highways	Wisconsin DOT
Minn DOT Wetland Habitat MB	MN, statewide, 9 reg. accounts , 40 sites	highways, rest area constr., airport construction	Minn DOT
Montana Interagency Wetlands Committee Bank	MT, statewide (multiple tracks)	highways, possibly other state activities	Montana DOT
South Dakota Wetlands Accounting System Bank	SD, Arlington	highways	South Dakota DOT
North Dakota Wetlands Bank	ND, Statewide	agric. drainage projects	ND Game & Fish Dept & Water Commission
North Dakota State Highway Department	ND, State-wide	highways	ND State Highway Dept & USFWS
Falkirk Mine	ND, Underwood	mining	North American Coal
Aciquia Wetland Bank	ID, Cassia Co.	highways	Idaho DOT
Old Beaver	ID, Clark Co.	highways	Idaho DOT
Mud Lake State Wildlife Management Area	ID, Jefferson Co.	highways	Idaho DOT
Weyerhaeuser Company - North Spit Mit. Plan	OR, Coos Co.	development, highways	Weyerhaeuser Company
Port of Astoria Land MB	OR, Clatsop Co.	port development	Port of Astoria
Astoria Airport Mitigation Bank	OR, Clatsop Co.	development	Oregon Div. State Lands
Washoe Lake Mitigation Bank	NV, Washoe Co.	highways	Nevada DOT
Mid-City Ranch	CA, Humboldt Co.	public utilities, highways	Humboldt Co.
Bracut Marsh	CA, Humboldt Co.	indus. development, govt facilities	Cal. State Coastal Conservancy
Springtown Natural Communities Reserve	CA, Livermore	all types of activity	Wetland Exchange Co. of California
Cal Coastal Conservancy - Huntington Beach	CA, Orange Co.	highways	Cal. State Coastal Conservancy
ACWHEP (Aliso Creek)	CA, Orange Co.	general land development	Orange Co., Mission Viejo Comp.
Port of Long Beach - Pier J, Anaheim Bay MB	CA, Orange Co.	port development	Port of Long Beach
Port of Long Beach - Pier A Newport Bay	CA, Orange Co.	port development	Port of Long Beach
Port of Los Angeles Inner Harbor	CA, Los Angeles Co.	port development	Port of Los Angeles
San Joaquin Marsh	CA, Orange Co.	general land development	The Irvine Company
Naval Amphibious Base Eelgrass Mit. Bank	CA, San Diego Co.	dredging & facilities	Dept of the Navy
SeaWorld Eelgrass Mitigation Bank	CA, San Diego Co.	shore development, private projects	SeaWorld

Table 2. **WETLAND MITIGATION BANKS UNDER PLANNING**, Institute for Water Resources Preliminary Survey Data, June 1992.

Name of bank under planning	Location	Activity
New Jersey DOT WMB	NJ	Highways
Passaic River Central Basin Wetlands Bank	NJ, Essex, Morris, & Passaic Counties	Water resources dev. (flood control)
Hackensack Meadowlands	NJ, Hudson Co., Hackensack River	General land development
Chimento	NJ, Monmouth Co.	Land/Water resources development
Dismal Swamp	NJ, Middlesex Co.	Land/Water resources development
Prince George's County Dept of Envir. Resources	MD, Prince George's Co.	
Ragged Island Wildlife Management Area - Offshore Island Creation	VA, Lower James River Basin	Port development
Creeds	VA, Virginia Beach, Back Bay watershed	City Capital Improvement Proj.
Lowe's Island WMB	VA, Loudoun Co., Sugarland Run	General development
Dale City WMB	VA, Prince William Co., Neabsco Creek	Subdivision & general development
Northern Virginia WMB	VA, Fairfax Co., Manassas, Bull Run watershed	Highways
Vandross Bay	SC, Georgetown Co.	Highways
Millhaven Plantation Commercial WMB	GA, Screven and Burke Counties, Brier Creek	No specific activity
Marshland Plantation Commercial WMB	GA, Camden Co., Satilla River	No specific activity
Bird Drive Mitigation Bank	FL, Dade Co., Hole in the Donut, Everglades Nat Park	Residential, commercial & agricultural
North Trail WMB	FL, Dade Co., North Trail Basin (Everglades)	Residential, commercial & agricultural
Mud Lake Mitigation Bank	FL, Orange Co., Mud Lake Boggy Creek	Airport development
Orlando International Airport Build-Out	FL, Orange Co.	Airport development
Florida DOT Saddle Creek	FL, Polk Co., Saddle Creek Basin	Highways
SE Hillsborough County Mitigation Bank	FL, Hillsborough Co., Alafia River watershed	Highways & utility projects
SW Fla Reg. Wildlife & Wetlands Conservation & Mitigation Area	FL, Collier Co., primary watershed, Rookery Bay	General residential development
Northwest Hillsborough County Mitigation Bank	FL, Hillsborough Co., Old Tampa Bay watershed	Highways & utility projects.
Wetlands Landbank of Florida, Inc.	FL, Broward Co., East Everglades	General land development
Walt Disney World	FL, SW Orange & NW Osceola Counties	Commercial & residential development
State of Alabama Highway Department	AL, Morgan Co. adjacent Wheeler Wildlife Refuge, Tennessee River.	Highways
Department of Energy	TN	Hazardous waste disposal
TN DOT Mitigation Bank	TN, Shelby Co.	Highways
Arkansas State Highway & Transportation Department	AR, three regional WMB's; (1) Delta Region; (2)Interior Highlands; (3)Gulf Coastal Plain	Highways
Barksdale Air Force Base WMB	LA, Bossier Co.	General land development
Stennis Space Center WMB	MS, Hancock Co.	General land development

Name of bank under planning	Location	Activity
Pass a Loutre deltaic splay development	LA, Plaquemines Parish	Oil & Gas, Indus & Comm activities.
Terrebonne Parish Bottomland Hardwood/Point Au Chene	LA, Terrebonne Parish	Forced drainage projects
Himont expansion bottomland hardwood bank	LA, Calcasieu Parish	Industrial plant expansion
Commercial Mitigation Bank	TX, Aransas Co., McCampbell Slough	
Dow Nature Refuge	TX, Lake Jackson	Industrial development
Taylor Lake Nature Preserve and WMB	TX, Harris Co.	General land development
International Center Preservation of Wild Animals	OH, Muskigum, Muskingum Basin Area	All activities approved for mitigation.
Geist Reservoir WMB	IN, Marion Co., Fall Creek Watershed	General land development
Morse Reservoir WMB	IN, Hamilton Co., Cicero Creek Watershed	General land development
Winfield Creek	IL, Du Page Co.	General land development
Lake County	IL, Lake Co.	General land development
St. Clair County, Illinois Wetlands Banking	IL, St. Clair Co. - Richland & Silver Creeks, Kaskaskia River, and Mississippi River.	Airport expansion, industrial development, highways, rail,
MO Hwy & Trans. Dept.	MO	Highways
Lancaster County, Nebraska	NE, Lancaster Co.	Varied general county activities
Nebraska Dept. of Roads	NE	Highways
Wyoming Department of Transportation	WY, State-wide	Highways
Provo City WMB	UT, Utah Co., Utah Lake watershed	General land development
Tenth West Corridor WMB	UT, Cache Co.	General land development
New Mexico DOT WMB	NM, Valencia, Rio Grande River	Highways
Tonto Creek	AZ, Tonto Creek	Reclamation projects
Mission Bay Eelgrass Mitigation Bank	CA, San Diego Co., Mission Bay	Shoreline stabilization, storm drainages
Port of Los Angeles Batiquitos Lagoon	CA, San Diego Co., Batiquitos Lagoon	Port Development
Bill Signs Trucking WMB	CA, San Diego Co., San Diego River	General land development
Goleta Slough & Estuary Management Plan Area	CA, Santa Barbara Co., Goleta Slough	Land brokerage swapping
Gaviota Creek & Estuary Multi-Agency Mit. plan	CA, Santa Barbara Co., Gaviota Creek & tribs	Highways
Santa Ynez Planning Clearing Agreement Plan	CA, Santa Barbara Co., Santa Ynez River	Emergency vegetative mowing
Sacramento County WMB	CA, Sacramento Co., Stone Lake Wildlife Ref.	General land development
Placer County WMB Program	CA, Placer Co., Sacramento River Watershed	General land development
Turner Mitigation Bank	OR, Marion Co., Battlecreek Watershed	Highways
Dalton Lake Mitigation Bank	OR, Columbia Co., Columbia River.	Highways
Colville WMB, Stevens County	WA, Stevens Co., adjacent Highway 395	Highways
Mill Creek Special Area Management Plan	WA, King Co., Mill Creek Basin	General land dev., wetland restoration
Green River	WA, King Co., Green River Basin	Highways
City and Borough of Juneau WMB	AK, City & Borough of Juneau	Residential & commercial development

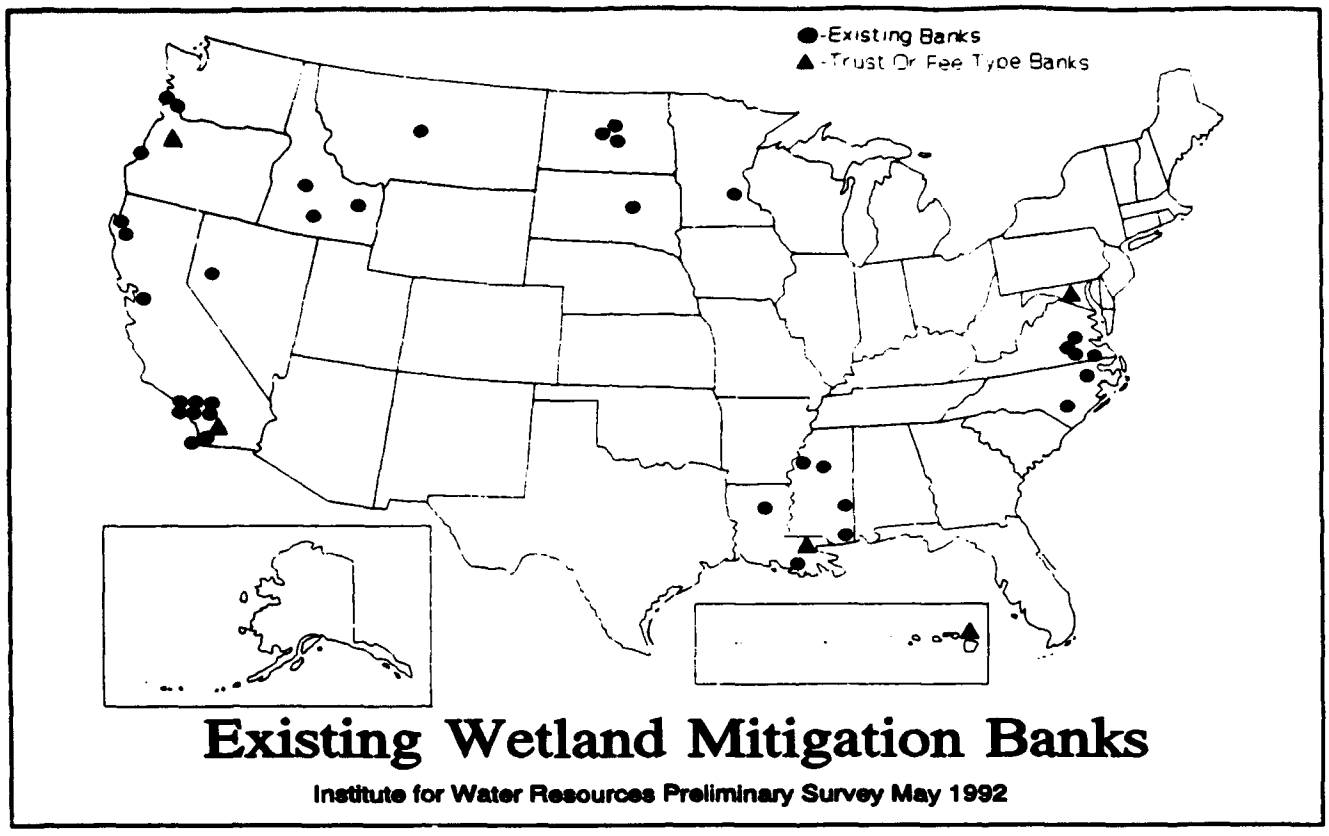

Figure 1

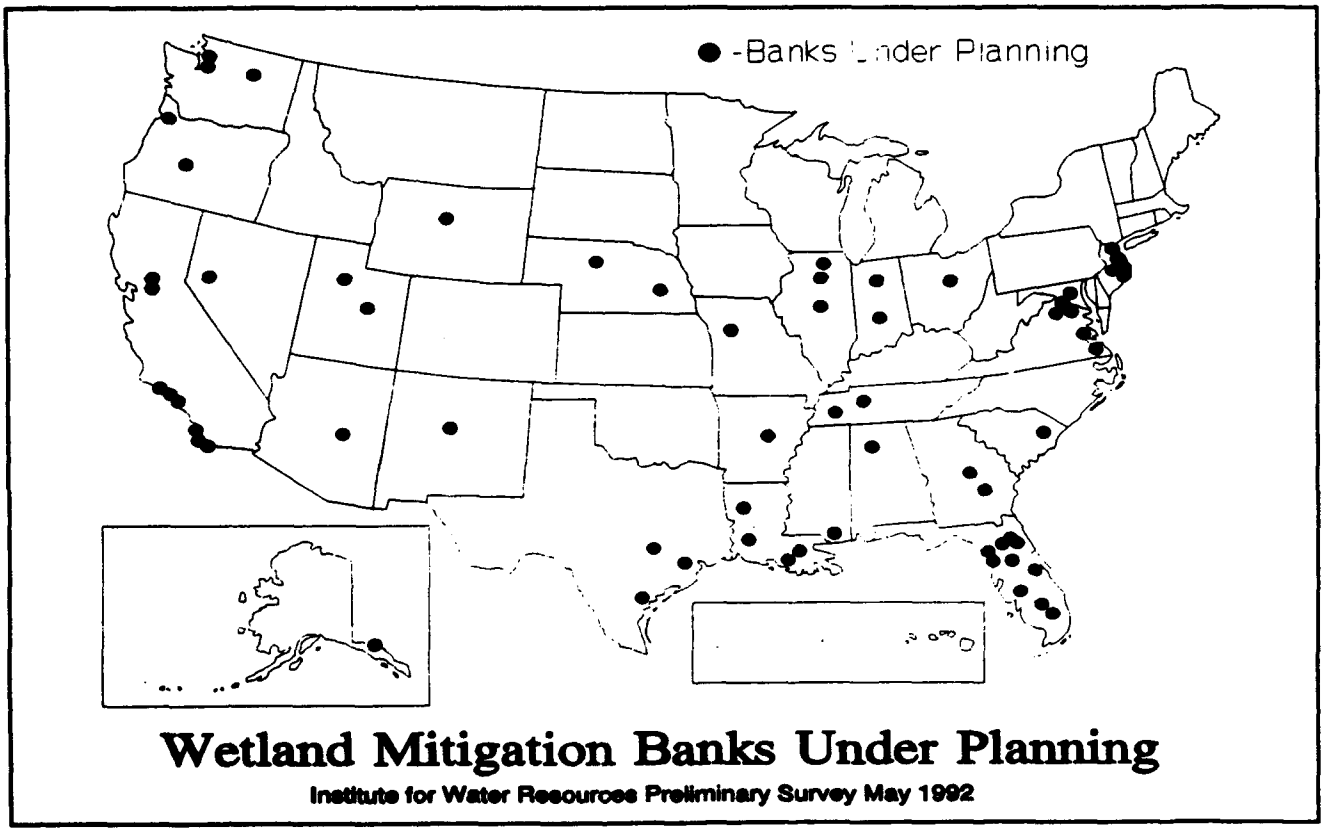

Figure 2

results to the extent that several banks are currently operating at a deficit.

(1) Positive aspects. Details on the beneficial aspects of wetlands mitigation banking as reported by Comiskey and Stakhiv (1983), Short (1988), Steever (1991), and others are as follows:

(a) Consolidation of small wetland losses. Banks make it possible to compensate small wetlands losses, which typically go unmitigated because of their insignificant size coupled with the frequent inability to mitigate on-site. By consolidating these small losses, banks provide an increased level of success to compensatory mitigation objectives.

(b) Mitigation in advance. Because they are normally established in advance, mitigation banks eliminate the lag time between loss and replacement which might otherwise exist with other forms of mitigation. In so doing, banks permit the goal of no net loss of wetlands to be realized at the single project or permit level.

(c) Increased planning effort. Also because they are established in advance, banks have the advantage of a greater level of effort and more expert attention, thus more thorough, ecologically sensitive planning and design. This benefit also permits mitigation efforts to be better integrated into state, regional and local wetlands planning efforts.

(d) Higher environmental and social value. Owing to their relatively large size, banks tend to be more environmentally valuable and offer more options for resource management as well as public appreciation and use than small parcels of wetlands normally associated with mitigation on a piecemeal basis.

(e) Conflict resolution. While considerable difficulty may be experienced in the initial establishment of banks covering regulated activities, once in operation they tend to minimize the conflicts between individuals and institutions in subsequent permit actions.

(f) Monitoring and evaluation. Because banks involve fewer, larger wetland sites, they facilitate the monitoring and evaluation of mitigation efforts.

(g) Improved regulatory climate. Because the mitigation element is taken care of in advance, banks make for faster permit processing and decision-making and provide economies of time and money for both permit applicants and the regulating agency. Banks also bring an increased level of predictability to the regulatory process and thus remove much of the financial risk associated with permitted activities.

(h) Public recognition and support. Because of the size factor, banks have higher visibility and public profile which provide incentives for private developers to participate in their establishment.

(i) Economic efficiency. Economies of scale are inherent in wetlands mitigation banking and thus it is normally less costly to establish and manage one large wetland unit than many small compensatory wetland areas.

(j) Permanence. Banks provide the opportunity to effect more formal and lasting arrangements for the preservation and maintenance of wetland areas.

(2) Negative aspects. Potential shortcomings of banks as reported by Short (1988), the Institute for Water Resources and others are as follows:

(a) Purported reduction in quality of planning and regulatory decision-making. There is a perception that the existence of banks allows the full sequencing provisions of

the regulatory decision-making process to be circumvented and poses the possibility that bank credits will be used to compensate for wetland losses before means of avoiding or minimizing losses and opportunities for on-site mitigation are properly evaluated. Although this was identified as a perceived problem by Short (1988), that author has acknowledged that there is actually no empirical evidence to substantiate the effect.

(b) Uncertainty of wetland management techniques. None of the traditional wetlands management techniques are totally proven and all possess limitations which sometimes detract from their utility in wetlands mitigation banking. The use of preservation as a means to compensate wetlands losses is a particularly contentious point among those who argue the pros and cons of wetlands mitigation and merits explanation.

Preservation of existing wetlands areas for compensation purposes becomes a valid consideration only when it can be shown that the wetlands in the preservation area would be lost in the absence of preservation. If this condition cannot be met, wetland losses would not be replaced -- in fact, preservation would result in a net reduction in wetlands. Because the loss of wetlands is many times difficult to predict, preservation is not routinely used as the sole basis for crediting in wetlands mitigation banking. The extent to which preservation is typically used is to allow partial fish and wildlife management credit (in the neighborhood of 10 to 15% of existing values) (Short, 1988) to recognize the value of public ownership and responsible management of preserved areas on a case by case basis.

Wetlands creation is regarded in scientific circles as a still somewhat experimental technique. Under close scientific scrutiny, certain artificial wetland areas created to date have been found not to have the equivalent attributes of natural wetlands which they are intended to duplicate. To a large degree this can be attributed to their youth and immaturity, particularly with respect to their edaphic characteristics. However, the time span needed for created wetlands to assume true natural character is uncertain.

While wetlands restoration and enhancement exist as the surest techniques for the purposes of wetlands mitigation banking, the slow rate at which many wetlands actually return to the natural state or to an enhanced condition and begin to amass bankable credits has also been a problem in several cases.

Explicit account must be given to these known limitations in the planning of banks, particularly in their sizing, the determination of mitigation credits and in the development of debiting and crediting procedures.

(c) Incomplete mitigation or necessity for out-of-kind mitigation. Because, by definition, banks entail the mitigation of wetland losses off-site, they may be incapable of replacing in-kind all the known natural functions and intrinsic human use values which the impacted wetlands possess. Despite attempts in the selection of bank sites to bracket all of the types of wetlands anticipated to be impacted over time, the precise matching of wetlands types and functions may not be possible in all cases owing to the distances involved and the physical and ecological differences which exist between impact sites and the mitigation sites. Although out-of-kind wetlands replacement can be made one of the allowable provisions in bank operating agreements, the debiting and crediting criteria and procedures for effecting this are uncertain in a technical sense as well as a potential source of conflict between development concerns and banks operating interests.

(d) Primitive nature of crediting and debiting techniques. The state of the art in debiting and crediting is not developed

sufficiently well to cope with all situations. While fish and wildlife debiting and crediting procedures can be readily developed using habitat units as the form of "currency", other wetland functions do not readily lend themselves to quantification. Therefore, banks established for the compensation of broader arrays of wetland functions and values may entail costly indepth study on a case by case basis.

(e) Administrative and financial considerations. Wetland mitigation banks often entail conflicts between entities involved in their establishment, requiring extensive time and resources to resolve. Banks also require a commitment for long-term operation and maintenance; generally this commitment can be found in major corporations or government organizations, but may not be forthcoming in situations where such entities are not involved. Last, despite the economy of scale which is inherent in wetlands mitigation banking, the costs entailed in the acquisition, establishment and operation of large wetlands areas could also constrain development of the concept.

Little detailed information is available pertaining to wetland mitigation costs. Short (1988) refers to a $500,000 investment by Tenneco LaTerre (later becoming Fina LaTerre) but with no indication whether this covered only initial capital improvement or also included continuous management of the firm's 5000-acre bank. The only other reference to costs made by Short is in the form of USFWS personnel time requirements for bank establishment which have ranged to 2 person-years per bank.

Also, a recent contract study by EPA (EPA, 1991) reported costs for 9 existing banks ranging from $223 to $20,000 per acre and averaging $3,630 per acre. Presumably these represent capital costs for land acquisition and initial development.

3. The Wetlands Mitigation Banking Demonstration Study

The purposes of the Wetlands Mitigation Banking Demonstration Study are to comprehensively describe and evaluate wetlands mitigation banking and its variant, fee-mitigation; determine their potential for achieving established national wetlands goals; determine their applicability to Corps of Engineers programs and projects; develop guidance for their establishment and operation at the field level and to formulate and design a demonstration program for potential authorization and implementation by the Corps of Engineers.

Specific study objectives are:

a. To comprehensively review and analyze the history and present status of wetlands mitigation banking and fee-mitigation based on literature research; coordination with agencies, organizations and individuals with known involvement with the concepts; and case history studies. This is intended to be an indepth analysis of all the known technical and policy issues associated with the concept.

b. To determine the feasibility of wetlands mitigation banking and fee mitigation as means to achieve the established national interim goal of no net loss of wetlands and the long-term goal of net gain of wetlands as defined by acreage and function.

c. To determine the applicability of wetlands mitigation banking and fee mitigation to the Corps of Engineers water resource development program and to identify any additional statutory authority which may be required to facilitate program development.

d. To determine the federal interest in wetlands mitigation banking and fee mitigation in conjunction with the Corps of Engineers regulatory program, the extent of direct federal involvement in their establishment and operation, and the additional authority which would be necessary to facilitate such involvement.

e. To develop the concept of "market oriented" wetland mitigation banks and the types of incentives, supporting federal efforts and possible legislative authority which may be required to facilitate their establishment and operation.

f. To determine the need for and feasibility of a wetlands mitigation banking and fee mitigation demonstration program and, if determined to be feasible, to identify sites to serve as potential demonstration projects and recommend their implementation.

g. To assess techniques for estimating the wetland credits and debits involved in wetland mitigation banks and their associated wetland impact areas and procedures for conducting debiting and crediting operations. Emphasis in this objective will be on the multiple functions and values of wetlands cited in EPA Section 404(b)(1) Guidelines.

h. To develop criteria, techniques and procedures for effecting the out-of-kind compensation of wetland losses in a wetlands mitigation banking context.

i. To develop techniques and procedures for monitoring the effectiveness of wetland mitigation banks and for effecting any needed mid-course corrections in the makeup and operation of recommended demonstration projects.

j. To investigate all the (1) technical, (2) legal, (3) institutional, (4) financial, (5) real estate, (6) cost sharing and other factors which are relevant to the establishment and operation of recommended demonstration projects and develop detailed plans for their implementation.

k. To assist in the development of Corps of Engineers policy and implementing guidance which is applicable to both the regulatory and water resource development programs.

l. To develop an implementation manual providing potential bank sponsors and Corps of Engineers field elements with detailed procedural and technical guidance for their establishment and operation.

m. To develop a report suitable for submission to the Congress. The report should present the results of the study and contain specific recommendations concerning implementation of the demonstration program.

4. Issue Identification

The actual and perceived problems which have been identified in past evaluations of wetlands mitigation banking comprise issues which must be addressed in the study and in the development of a demonstr tion program. Other important issues which need to be addressed are those specifically identified in Subsection 307(d) of WRDA 90, which is the basic authorization for the study, and in policy statements on the subject of wetlands mitigation banking emanating frcm the Administration or agency level. Known issues and the manner in which they affect the scope and conduct of the study are discussed below.

a. The question of program and project applicability

The present inventory of wetland mitigation banks clearly demonstrates the applicability of the concept to the Corps of Engineers regulatory program. However, with few precedents to deal with, its applicability to other aspects of the Corps program, in particular to water resource development projects, remains open to question and constitutes an issue to be investigated in the study.

Examination of this issue should encompass the full scope of the Corps water resource development program with a view to identifying on one hand the impediments to wetlands mitigation banking which exist at the project level and potential opportunities which might be provided on the other.

b. Impact of wetlands mitigation banking on the quality of planning and the rigor of the regulatory decision-making process

The purported slippage in the rigor of the regulatory review and decision-making process brought on by the existence of wetland mitigation banks merits examination. Although there appears to be no empirical evidence that these effects are real, the fact that these suppositions are attributed to various seemingly independent sources nonetheless gives them an air of credibility which calls for their study and evaluation.

c. Uncertainty of wetlands management techniques

The scientific effectiveness of wetlands management techniques which are used for amassing credits in wetland mitigation banks remains open to question. This is particularly true of wetlands creation and preservation; however, even restoration, which is the most technically advanced of the wetland management methods, merits attention as it applies to particular wetland systems, restoration techniques being used and wetland functions being compensated.

The preservation issue is a highly contentious one and in many circles it is flatly dismissed as a compensatory measure inasmuch as it does not entail the actual addition to the wetlands base as do other compensatory techniques. However, the theory appears sound that it can serve this purpose so long as the destruction of wetlands in the absence of efforts to preserve them can be convincingly demonstrated (a

reality which militates against a convincing argument is the existence of various general wetlands protection measures at the federal, state and local levels). Clearly, study into this issue should be focused on identifying the criteria and procedures with which to predict the rate of loss of wetlands within prospective "preservation units" in the absence of preservation efforts.

There is a large and growing body of scientific literature on the subjects of wetlands creation, restoration and enhancement which tends to downgrade their effectiveness for compensatory purposes, at least for wetlands replacement on a one-for-one basis. Close scientific scrutiny of created wetlands in particular indicates that in many cases they do not have the same high qualities as the mature natural wetlands they are intended to replace.

Creation, restoration and enhancement all involve intense technical issues which are considered beyond the ability of this study to resolve completely within the time-frame and budget allowed. Fortunately, both these aspects are being examined indepth as part of the Corps of Engineer's Wetlands Research Program (WRP) now underway at the Waterways Experiment Station in Vicksburg, MS. While the timetables for the WRP and this effort do not fully coincide, WRP outputs could be available during the actual implementation of the demonstration program should it be authorized and funded.

WRP work units in the area of wetlands restoration and enhancement are comprehensive in nature and will include studies on a broad variety of wetland types and management methods. Work units in the area of wetlands creation are principally directed at the development of criteria for assessing the success or value of artificially created wetlands, which is information vital to the development of bank crediting procedures.

The wetlands creation issue has an important policy component which must also be addressed. Wetlands can be created either through (1) excavation or diking and flooding of fast-land in order to create the desirable hydrologic conditions conducive to the growth of hydrophytic vegetation, or (2) filling in deep water environments (with dredged material, for example) to create the same conditions. The latter method has the effect of sacrificing one type of high quality environment in order to create another, and raises important questions. The principal question to be addressed in this case is, under what circumstances is the filling of deep water habitats justified and appropriate for the purpose of wetlands mitigation banking? Are the tradeoffs worth it? Are there standard planning and decision-making criteria that might apply?

d. Advanced or after-the-fact compensation.

Most definitions of wetlands mitigation banking in common usage specify that wetland mitigation banks provide for the advanced compensation of wetland losses. Those who advocate that the use of bank credits be limited to the compensation of anticipated wetland losses do so largely for fish and wildlife reasons, i.e. to avoid even the most temporary loss of habitat which might have adverse ecological impacts on local and regional fish and wildlife populations. Under certain conditions these impacts could be irreversible and the reason for these concerns is therefore understandable.

On the other hand, rigid adherence to the concept of advanced compensation tends to overlook the quality scale which is inherent in habitat valuation and the fact that compensating in advance for habitats at the low end of the scale might not be as essential as those at the upper end. Examination of this issue should also recognize that compensation

after-the-fact need not result in the net loss of wetland habitat value if losses, and the credits needed to replace them, are computed based on average annual equivalents.

Still another side to this issue has to do with compensation for loss of the recognized physical functions of wetlands which have no critical biological processes associated with them. For example, is it essential to effect the advanced compensation for, say, loss of flood detention or groundwater recharge capability.

The study should provide an objective examination of this issue with a view to identifying those circumstances in which the mandated establishment and operation of wetland mitigation banks should be for the advanced compensation of wetland losses opposed to those circumstances in which banks could function on a more coincident or after-the-fact basis.

e. Out-of-kind mitigation

The ability to replace lost wetland functions and values in-kind may not be possible in all wetland mitigation banking situations. Nor is it necessary or desirable to do so as long as basic compensatory mitigation goals are met. Implicit in this objective is the ability to effect tradeoffs among wetland types, functions, scales of quality, and acreage in the development of bank crediting and debiting arrangements.

There are precedents for such tradeoffs in several existing wetland mitigation banks which have been negotiated on a case by case basis. The Administration's comprehensive wetlands protection plan would provide for satisfaction of permit conditions if it can be shown that the mitigation credits in banks are from the same or higher wetland category than the wetland areas which are subject to development. Out-of-kind tradeoffs are implicit in this policy statement whose implementation guidelines are yet to be developed. Conceivably, implementation can benefit from an analysis of underlying issues.

Existing examples of banks which involved qualitative and quantitative tradeoffs have met with total success in some cases and evident failure in others. At issue are the needs to examine the causative factors behind the indifferent results and to explore the development of standardized criteria and procedures for effecting tradeoffs.

f. Crediting and debiting techniques

Lack of tools for the quantitative rating and evaluation of wetland functions is one of the most serious issues to be faced in this study. While techniques for quantifying fish and wildlife habitat value are well developed and provide the principal basis for crediting and debiting in most existing wetland mitigation banks, available methodologies (WET for example) for quantifying other recognized functions do not now have the precision which is necessary for this purpose. What makes this a somewhat critical issue is the fact that one of the legal motivations behind wetlands mitigation banking are the EPA Section 404(b)(1) Guidelines which emphasize the existence of multiple wetland functions. Implicit in this is the necessity to put debiting and crediting procedures on the same basis.

The refinement of WET to both increase the number of wetland functions capable of evaluation and to give it a greater degree of precision is another timely feature of the Waterways Experiment Station Wetland Research Program. Outputs of the WRP as well as allied research and development work known to be underway in EPA should have direct application to the development of broad scope debiting and crediting procedures for use in wetlands mitigation banking.

There is also a policy component to the crediting and debiting issue which should be examined pending the outcome of R & D efforts: what should be the exact scope of the debiting and crediting procedures in given wetland situations? Is it necessary to quantitatively evaluate all of the recognized wetland functions and incorporate them into debiting and crediting arrangements in all banking situations? Or, alternatively, is there a shorter list of functions or perhaps surrogates which are adequate for this purpose?

g. The federal interest and agency authority

One of the factors limiting the growth of wetland mitigation banking for regulated activities is reported to be the lack of initiative on the part of potential bank sponsors, even in situations where the feasibility and desirability of wetland mitigation banks are obvious. In situations such as these, should the Corps of Engineers assume direct responsibility and take the initiative in the establishment and operation of banks? Assuming that the Corps does not now have the authority with which to initiate such actions or the required funding, should such authority and funding be sought? Should the authority be a general one or be sought in a case by case basis?

While there are no existing precedents for federal initiative and funding support for the establishment of regulatory-type banks, this condition could change with passage of certain legislation which is being considered by the Congress at the present time. For example, the Intermodal Surface Transportation Efficiency Act of 1991 has given the Federal Highway Administration authority to cost share the establishment of off-site wetland mitigation banks. Also, pending legislation reauthorizing the Clean Water Act could give EPA similar funding authority. Should the Corps of Engineers also seek such authority?

The same essential line of inquiry extends to the Corps of Engineers water resource development program. In the case of large projects requiring specific congressional authorization the authority to establish banks would of course be sought at the same time. Therefore large projects are not at issue. On the other hand, the allied issues of the federal interest and the Corps authority as they apply to continuing authority projects and projects in an operating mode are germane.

The Administration's comprehensive wetlands protection plan expresses a preference for development of a market oriented mitigation banking system providing incentives for private restoration or creation of wetlands that can be used to mitigate the effects of developed wetlands. However, the details of that plan are not yet available and it is not known at this juncture if it would have the effect of limiting the federal interest to banks of this type. Suffice it to say, definition of the federal interest is a dynamic situation which demands close attention because of the controlling influence it will have on the direction and outcome of the study.

If, indeed, the federal interest ultimately is limited to market oriented banks developed under the initiative of the private sector, presumably there would still be a regulatory responsibility in monitoring the operation of the banks in order to assure that compensatory mitigation objectives are met. The exact nature of this responsibility, and the specific manner in which the Corps of Engineers fulfills its role is within the scope of this issue (see also Paragraph 4k below).

h. Costs and cost effectiveness

Published information about the costs of wetlands mitigation banking is scant and could be one of the factors constraining broader application of the concept. A reliable basis for cost estimation covering all facets of wetlands mitigation banking is important to all entities potentially involved in banking, especially permittees and potential bank sponsors, be they public or private. The issue of costs is also important to the Corps because of the bearing it has on the analysis of alternatives in the review of permit applications and in the determination of cost effectiveness of mitigation in its own water resource development program.

The case studies involved in the early stages of the study will include a thorough review of wetlands mitigation banking costs.

i. Geographic scope of wetlands mitigation banking

In enacting the wetlands enhancement and restoration provisions in Section 307(d) of WRDA 90, Congress expressed an interest in "the appropriate geographic scope for which wetlands loss may be offset by restoration, enhancement, and creation efforts" (Subsection (3)(C)). In fish and wildlife terms it is desirable for wetland mitigation banks to be located in the same biotic region as the anticipated losses being compensated in order to maintain the physical continuity, ecological integrity and use patterns of the wetland habitats involved. In practice this is generally interpreted to refer to in-kind replacement environments located as close to the area of impact as possible. Because of the indefinite nature of this rule-of-thumb, the geographic scope of existing banks varies quite widely, but presumably without undo impact on their effectiveness. On the other hand, what is not clear in the literature on wetlands mitigation banking is how many potential banking efforts might have been frustrated due to lack of available wetland resources meeting these rough location criteria?

U.S. Fish and Wildlife Service criteria for establishment of wetland mitigation banks also specify that they be located in the same State in which the wetland losses occur. This criterion is in recognition of the proprietary interest which the States have in the management of their fish and wildlife resources. On the other hand, the Administration's comprehensive wetlands protection plan states a preference for mitigation within major hydrological units which may cross State lines (emphasis added). This potential conflict in the siting of banks bears close examination.

When the compensation of wetland losses involves other than fish and wildlife values the jurisdictional problem presumably is not as critical. However, the question of geographic scope remains problematic since there are no known wetland mitigation banks which have involved other than fish and wildlife resources to serve as precedents and no known studies into either the technical or policy dimensions of the problem. For example, how far off-site could a bank be located in order to replace, say, the flood detention or shoreline protection functions of wetlands in a wetlands mitigation banking context. The geographic scope of wetlands mitigation banking, particularly when geared to the compensation of multiple wetland functions and values remains very much at issue and an essential aspect of this study.

j. Ownership and liability

Another concern expressed by Congress in Section 307(d) of WRDA 90 has to do with the question of ownership and liability relating to restoration, creation and enhancement areas. Existing wetland mitigation banks are located

on either privately owned lands, leased or acquired in fee by bank sponsors, or on publicly owned lands under agreement between bank sponsors and the public land managing agency (several existing banks are located on state and federal wildlife refuges with wetland restoration efforts funded by bank sponsors). Typically, highway departments, the principal sponsors of wetland mitigation banks, transfer title to bank lands to a state resource agency for perpetual management. In the case of the private Fina la Terre WMB there has been no transfer of management responsibility and the company retains title to the lands. The Bureau of Reclamation's Bonneville, Utah mitigation bank was initially acquired by Burec, with title later transferred to the Utah Division of Wildlife Resources.

Ownership per se presents no evident problems. What is perhaps of greater interest to Congress are the means used to assure that banking objectives are met. Most existing banks involve MOA's (memoranda of agreement) which spell out details pertaining to management objectives, management techniques, crediting and debiting procedures, long-term operation, and provisions for corrective actions in the event of failure, together with the responsibilities of all signatory parties. The Fina la Terre MOA, for example, was signed by the company, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Soil Conservation Service, Louisiana Department of Natural Resources and Louisiana Department of Wildlife and Fisheries. The enforceability of the typical MOA is, however, unknown.

Also unknown is the extent to which deeds to banks might contain real estate covenants to assure that their objectives are met. Short (1988) notes just one instance, i.e. Burec's Bonneville, Utah mitigation bank, in which the deed transferring title to the state included a reversionary clause in the event of nonconformance. General uncertainty about the legal status of banks and the liability to assure that their objectives are met therefore constitute important issues.

From two standpoints, the permit process itself may be an effective guarantor that banks meet their stated objectives. First, to the extent that any wetland restoration or creation efforts involve the discharge of dredged or fill material requiring a Department of the Army permit, the Corps of Engineers is in a position to monitor the effectiveness of such actions as a matter if regulatory routine and facilitate any necessary corrections in the event failures are detected. Second, inasmuch as the approval of potential permittees to debit banks for compensatory mitigation purposes would take the form of permit conditions, the Corps presumably has at its disposal various administrative and legal means to achieve compliance with the terms of their establishment and operation and thereby assure their success. The study should examine the extent to which existing Corps of Engineers regulatory mitigation policies and procedures cover these aspects.

k. Monitoring

A final concern expressed by the Congress in Section 307(d) pertains to responsibilities for short- and long-term monitoring. The previous section concerned monitoring in a more or less physical context and suggested that this would primarily be a Corps of Engineers responsibility, particularly if the wetland restoration and creation efforts themselves entail regulated activities (i.e. the discharge of dredged or fill material). However, in this discussion the term monitoring is used in an operational context which includes the continuous evaluation of wetland management efforts, conduct of the crediting and debiting process and determination of remaining credit balances over the lives of the banks -- in other words, the role of the "banker."

Some relevant questions as they pertain to regulatory-type banks are: who is principally responsible for these monitoring functions? The bank sponsor? Federal agencies, including the Corps of Engineers? State resource and/or regulatory agencies? Or should it be a collective responsibility? These questions are relevant even in the case of strictly privately owned banks which might be established and operated for profit. Irrespective of ownership or sponsorship, there is an abiding public interest in the resources involved in banks which springs from the basic regulatory authority behind their establishment. This in turn is believed to dictate a continuing public sector role in their monitoring and evaluation.

The remaining questions concern (1) the extent of the public monitoring role, (2) the actual assignment (or acceptance) of responsibility, and (3) who should pay. If federal agencies are involved in monitoring, should their role be a passive one involving only casual oversight, or should it be a more proactive role involving commitment of significant levels of effort and funding?

The U.S. Fish and Wildlife Service, which is now the principal federal actor in wetlands mitigation banking, has expressed concern over the high manpower and financial costs which their active participation now entails. Presumably the Corps of Engineers would have similar concerns should it in future find itself similarly involved. These questions would become particularly significant were banks to proliferate beyond the relative few which are now in existence nationwide.

Specific to the subject of monitoring costs, in federal water projects mitigation costs are normally regarded as project costs which are allocated and apportioned in accordance with project purposes and presumably the monitoring of project related banks would be treated the same way. But how should costs be borne in the case of regulated activities? Should permittees or bank sponsors bear all costs associated with banks, including short- and long-term monitoring, or should the federal agencies continue the present practice of assuming the costs of their involvement? (refer also to paragraph 4g above which discusses the federal interest and responsibility in wetlands mitigation banking). If permittees or sponsors pay monitoring costs, should this be in the form of a one-time fee paid into an escrow account or trust fund, for example, or should it be billed and paid on a piecemeal basis as periodic monitoring is performed? There are reported to be legal constraints which currently prevent Federal agencies from receiving funds from privately held trusts under certain circumstances -- the legal and administrative aspect of this potential problem must also be examined in the context of monitoring.

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