1992

Mitigation Banking: A Potential Tool for Port Planners

Laura Kelley
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MITIGATION BANKING:
A POTENTIAL TOOL FOR PORT PLANNERS

BY
LAURA KELLEY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
IN
MARINE AFFAIRS

UNIVERSITY OF RHODE ISLAND
1992
MASTER OF ARTS THESIS
OF
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APPROVED:

Thesis Committee

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DEAN OF THE GRADUATE SCHOOL:

UNIVERSITY OF RHODE ISLAND
1992
Mitigation banking has been used as a means of facilitating the permit process by removing the negotiation of appropriate mitigation for development from the confines of the permit process. A developer with frequent needs to mitigate for losses associated with Section 404 and Section 10 requirements may, using a mitigation bank, consolidate mitigation and in so doing, potentially reduce mitigation costs. As a result of routine maintenance, as well as expansion requirements, ports were considered to be good candidates for sponsoring mitigation bank efforts. Port use of mitigation banking has not been as expected due to a lack of available mitigation sites, regulatory restrictions, and high costs.

This thesis supports the hypothesis that the number of mitigation banks has grown significantly since 1988, when the last inventory of mitigation banks in the U.S. had been conducted. This growth can be attributed largely to the increase in the number of department of transportation-sponsored banks.

Bank sponsors contacted generally expressed positive attitudes toward mitigation banking and the number of banks is expected to grow. It remains to be seen whether mitigation banking has provided an environmentally successful alternative to the current practice of negotiating mitigation within the permit process. Little research has been conducted on the general benefits and problems that have been experienced in mitigation banking.
ACKNOWLEDGEMENTS

I wish to thank my advisor, Bruce Marti, for his support during the writing of this thesis and for his constant encouragement throughout my graduate education. I am grateful to Gerald Krausse and Frank Golet for their willingness to serve as committee members. Special thanks are owed to my family and David whose patience and support have made this thesis possible. I also wish to thank Lew Alexander, the Miguels, K.T. and Ed.

The list of kind people who provided information for this thesis would be a chapter in itself. I am particularly grateful to Tom Johnson of the Port of Long Beach, James Brown of the Fish and Wildlife Service and Mike Walsh for sharing their insights and expertise.
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CHAPTER ONE
INTRODUCTION

Statement of Problem

Costs, in terms of both time and dollars, associated with meeting mitigation requirements imposed on ports, as a result of environmental regulations, are often viewed by port managers as excessive impediments to port development and maintenance activities (AAPA, 1986). These costs may affect a port's capacity to respond to market demands in a timely and cost efficient manner. Consequently, they may negatively impact the individual port's competitive position. In an attempt to alleviate this situation, a number of ports have considered establishing mitigation banks. Mitigation banking involves formally undertaking steps to create, restore, or enhance habitat for which credits are earned in anticipation of future requirements to compensate for unavoidable losses associated with development.

Mitigation banks have been established in response to mitigation requirements associated with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA), two pieces of legislation that have had major implications for port
development activities in recent history (Short, 1988). Generally, regulations associated with Section 404 and Section 10 require that dredge and fill activities be authorized by the Army Corps of Engineers through its permit process. Since normal port maintenance necessitates routine dredge and fill activity, ports are habitually involved in the Section 404/10 permit process. Within this permit process, ports, as well as other applicants, must negotiate appropriate mitigation for unavoidable impacts associated with the proposed activities. The negotiation of mitigation often becomes a time-consuming and frustrating process for all parties involved, particularly when the permit application is for a large development plan. In the highly competitive world of commercial shipping, ports cannot afford costly delays in maintenance and development activities due to conflicts during the negotiation of mitigation (Hershman, 1988). Mitigation banking offers a potential tool for port administrators and the regulatory community to reduce conflict in the permit process by removing the construction of mitigation projects from the permit process.

As of 1988, thirteen mitigation banks had been established and ten potential banks had been identified (Short, 1988). For the purposes of this and any future studies focusing on mitigation banking, a current inventory is necessary. Further, the performance of these banks in meeting the specific goals of mitigation banking must be assessed in order to determine the value of this concept to the port industry (AAPA, 1986). The two main advantages of mitigation banking perceived by the developer or the port
administrator are that it speeds up the permit process and, in so doing, reduces overall mitigation costs. Mitigation for a number of minor projects, such as routine port maintenance activities can be consolidated to a single site. Total mitigation costs, therefore, may also be reduced as a result of the permit applicant's ability to take advantages of economies of scale in mitigation projects.

The nature of mitigation banking requires that results be assessed over time. Only through retrospection can it be determined whether or not the proposed advantages of mitigation banking are actual or merely theoretical.

**Purpose of Study**

A major purpose of this study is to review current use of mitigation banking in the U.S. A comprehensive inventory of mitigation banks within the U.S. has not been conducted since 1988 (Short, 1988). At that time thirteen established banks and ten potential banks were identified. An earlier inventory, conducted in 1985 identified eleven mitigation banks (Soileau, et al., 1985).

The inventory focuses on the performance of existing mitigation banks in meeting the goals of their respective sponsors (developers) and resource agencies. Little research has been conducted to determine whether proposed benefits and problems have actually occurred. If it is found that the results of these efforts, in the opinion of those involved in the implementation of mitigation banks, have justified the time and effort required, then future research is
warranted. It may be found, however, that the results of initial attempts at mitigation banking do not support continued pursuit of the concept by permit applicants. An analysis of attitudes toward mitigation banking will be conducted in order to evaluate the direction of mitigation banking and potential areas of concern. A related purpose of this thesis is to discover areas for future research.

**Hypotheses and Methods**

It is hypothesized that sponsors of implemented mitigation banks continue to have a generally positive attitude toward mitigation banking in spite of difficulties associated with bank planning and implementation. It is further hypothesized that ports have had the greatest degree of success with this approach to mitigation. Success will be determined on the basis of interviews, past performance of banks and the current inventory of banks. It is believed that the lack of opportunities for on-site mitigation, ongoing dredge and fill needs, and the competitive nature of the port industry make ports excellent candidates for sponsoring mitigation banks. In order to test these hypotheses, a current inventory of implemented mitigation banks in the U.S. is necessary. It is subsequently hypothesized that the number of mitigation banks in the U.S. has increased from the thirteen counted in 1988 despite the lack of comprehensive studies confirming the actual benefits of the concept. This would be consistent with the growth in the number of

In testing the hypothesis that the number of mitigation banks continues to grow and, in the interest of consistency, the methodology used by Cathleen Short in her 1988 study has been utilized. This methodology involves contacting regional US Fish and Wildlife Service (FWS) offices and compiling a current inventory of active mitigation banks with FWS involvement. Contacts were then made at the FWS field office level, with bank sponsors, and with other resource agencies at the federal, state and regional levels to obtain specific details on mitigation banks.

Since the FWS has the responsibility to seek mitigation for losses of fish, wildlife, their habitat and uses thereof from land and water development under the Fish and Wildlife Coordination Act of 1958 (FWCA), the FWS was a logical starting point for this research. The inventory compiled in this thesis relies heavily on banks with FWS involvement, but every attempt has been made to include banks with which the FWS has not been involved.

An experience survey of those involved in bank efforts, which focused on attitudes on the value of mitigation banking as an effective planning tool, was conducted by telephone in order to test the hypothesis that sponsors of mitigation banks continue to have a generally positive attitude toward mitigation banking. Both open-ended questions and a Likert Scale were used in interviews to determine which, and to what degree, potential benefits and problems have been realized. For a number of reasons a flexible approach to interviews was required. To allow for comparisons,
interviews were also conducted with resource agency personnel.

**Organization of Thesis**

Chapters Two and Three of this thesis provide background on the institutional framework which requires mitigation, and the effect of mitigation requirements on ports. A review of the mitigation banking concept and its potential port use is contained in Chapter Four. A current inventory of implemented, nearly implemented, and potential mitigation banks is contained in Chapter Five. Chapter Six includes a discussion of inventory results. Chapter Seven is an analysis of attitudes expressed by individuals with experience in mitigation banking, and general conclusions are made in the final chapter.
Mitigation: An Overview

Mitigation is the undertaking of steps to avoid or minimize impacts associated with development activities. In cases where impacts cannot be avoided, mitigation can also be accomplished through compensation by replacing or providing substitute resources. The Fish and Wildlife Coordination Act (16 USC 661-667[e]) provides the conceptual and legislative foundation for mitigation. The Act mandates that wildlife resources and their conservation be given "equal consideration" in federal water resource development programs and private projects constructed under federal permit or license. The requirement that means and measures to prevent loss of, or damage to, wildlife resources be undertaken gives rise to the concept of mitigation (Soileau, 1985).

Definitions of mitigation used by developers and regulators reveal the differences in perspectives with which each approaches this requirement. Ports, as major waterfront developers, have increasingly come to view mitigation as a necessary management
practice, negotiating tool and additional cost in the development process (AAPA, 1986; Wessel and Hershman, 1988). Regulators have expanded the scope of the concept to include not only avoidance and minimization of adverse environmental impacts, but also the creation, restoration, and enhancement of environmental resources (Soileau, 1985; Boesch, 1987). Misuse of the term leads to further confusion. A compensation project is frequently referred to as "the mitigation" whereas, in fact, the mitigation includes avoidance and minimization requirements. For the purpose of this thesis, mitigation is any action formally undertaken to avoid, minimize and/or compensate for environmental losses in order to meet permit requirements.

Over the past thirty years, the geographical application of mitigation has been broadened from isolated dam construction sites to include, almost exclusively, aquatic and wetland ecosystems (LaRoe, 1986). Wetlands are areas such as marshes, swamps and bogs, which are periodically or permanently inundated or saturated by surface or ground water and support vegetation adapted for saturated soil (40 CFR 230.3). Since the 1970s, government behavior has reflected an increasing awareness of the public value of wetland and coastal ecosystems. Legislation, enacted as a result of the environmental movement of the late 1960s and early 1970s, has had a profound impact on coastal development activities and has altered the nature of port administration in the U.S. (Hershman, 1988). Throughout most of this century, the federal government had encouraged the draining and filling of wetlands. An example of this
policy was the Agricultural Conservation Program (1940-1977) which provided technical information and cost sharing for wetlands draining projects (AAPA, 1986). The result of this and other policies, or lack thereof, governing wetlands was the loss of more than half the wetlands in the lower 48 states (Tiner, 1984). This is roughly equal to one hundred million acres, or an area slightly smaller than the state of California (Davis, April 12, 1989).

Wetlands are now recognized for their contributions to fish and wildlife resources, flood control, water quality, shoreline stabilization, and for their aesthetic and recreational values (Tiner, 1984). National recognition of wetland values has led to a wide application of mitigation requirements in those areas which often surround waterfront development sites and ports. As further evidence of United States governmental recognition of the importance of wetlands, President Bush articulated in his 1990 budget statement a national goal of no net loss of wetlands.

The federal definition of mitigation is contained in the National Environmental Policy Act (NEPA) and was provided by the Council on Environmental Quality in 1978 (40 CFR Part. 1508.20 [a-e]). The definition/approach is applied sequentially and the level of mitigation must correspond directly with the value and scarcity of the affected habitat (Holmberg and Misso, 1986). Mitigation may be accomplished by:

1. avoiding the impact altogether by not taking a certain action or parts of an action;

2. minimizing impacts by limiting the degree or
magnitude of the action and its implementation;

3. rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

4. reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and,

5. compensating for the impact by replacing or providing substitute resources or environments.

In general, when reviewing a permit, the U.S. Army Corps of Engineers (COE) seeks to first avoid impacts, then to reduce impacts, and finally to prescribe "appropriate" and "practicable" mitigation for unavoidable impacts associated with the permitted activity. Appropriate mitigation is based solely on the values and functions of the aquatic resources impacted. Practicable mitigation is that mitigation which is available and capable of being done after considering cost, existing technology, and logistics in light of overall project purposes (Dept. of Army/EPA MOA, 1990). "Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required" (Dept. of Army/EPA MOA, 1990).

The Institutional Framework

Attempting to concisely describe relevant legislation and the roles of local, state and federal agencies in wetland regulation can
be likened to entering the type of quagmire many often think of when the word "wetland" is heard. One can easily sink when trying to decipher the relationships between pieces of legislation and among agencies at all levels of government. This has been attributed to the patchwork approach to federal regulation of wetland activities but may also be an indication of the growing awareness of the broad range of wetland functions and values. The following is a brief description of applicable legislation and the roles of various agencies in wetlands regulation and port dredge and fill activities.

The Fish and Wildlife Coordination Act

As noted, the 1958 Fish and Wildlife Coordination Act (16 USC 661 et seq.) provided the cornerstone for the development of the concept of mitigation. Under the terms of the Act, the COE must consult with the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS) and relevant state agencies in order to coordinate wildlife conservation and rehabilitation goals with proposed water resource development activities which require federal permit. Recommendations for mitigating losses associated with development plans must be fully considered by the COE in permit decisions.

The Rivers and Harbors Act

Prior to the early 1970s, the most significant piece of national legislation applicable to development in coastal areas was the 1899 Rivers and Harbors Act (33 USC 401 et seq.). Section 10 prohibits
any activity which may impact the navigable capacity of U.S. waters without a permit from the COE. Its primary purpose was to ensure that private structures do not interfere with federal interstate navigation. In 1970, the Act was rewritten (P.L. 91-611), directing the COE to promulgate guidelines for considering the effects of proposed harbor development and requiring that both economic and environmental factors be considered in any federally financed project (Boschken, 1988).

The Clean Water Act

Although intended as a water quality act, the Federal Water Pollution Control Act of 1970 (33 USC 1344), and amendments made in 1972, referred to as the Clean Water Act (CWA), is the major piece of legislation regulating dredge and fill activities in coastal and wetland areas. Of particular significance are Section 404 permit regulations controlling disposal of dredged or fill materials (33 CFR Sect. 320). As a result of a 1975 appellate court interpretation in the case of National Resources Defense Council v. Callaway (392 F. Supp. 685), protection under the CWA was extended to wetland areas (Boesch, 1987). "The geographical limits of jurisdiction under Section 404, after years of litigation now includes virtually all U.S. surface waters, such as wetlands, bogs, sloughs and intermittent streams, as well as navigable waters in general" (Hershman and Kory, 1988, p. 111).

Under Section 404, the COE and the Environmental Protection Agency (EPA) have major roles and joint jurisdiction over permitting
dredge and fill activities. While 404(a) authorizes the COE to issue
permits for dredge and fill activities, Section 404(b) requires the
EPA to provide policy Guidelines (40 CFR Sect. 230) "which are the
environmental criteria that must be met before a Section 404
permit can be issued" (Riley, April 12, 1989). The COE is charged
with evaluating permit requests based on these guidelines and its
public interest review procedures which require, among other
things, the consideration of water dependency, practicable
alternatives and compensation, when appropriate. Section 404(c)
gives the EPA effectual veto authority in permit decisions by
allowing the EPA to prohibit or restrict the discharge of dredge or
fill material when the agency determines an unacceptable level of
adverse environmental impacts on the general public (Riley, April
12, 1989). The COE can issue a Section 404 permit only after
specific water quality criteria have been met and the project is
deemed not to be contrary to the public interest. Generally, the COE
is responsible for operation, and the EPA for administration, of
Section 404 (Zagata, 1985).

Section 401 of the CWA requires permit applicants to obtain
state water quality certification prior to receiving a COE permit.
State water quality agencies may attach mitigation conditions to
certificates or request mitigation during the COE review process
where their comments are fully considered (AAPA, 1986).

It should be noted that only those activities in wetlands which
result in the discharge of dredge or fill material are governed by
Section 404. When a wetland is altered without any discharge of

13
excavated material into the wetland, Section 404 does not apply. As a result, most wetland losses are beyond the scope of Section 404. As a nation we continue to lose almost 300,000 acres per year from man made or natural causes (Dahl and Johnson, 1991).

The National Environmental Policy Act

The National Environmental Policy Act of 1969 (42 USC 4321, et seq.) sets the framework for the federal role in protection of the environment. It requires scientific evaluation of environmental impacts of federally permitted activities and interagency consultation in decision making. Under the authority of NEPA, Environmental Assessments (EA) or Environmental Impact Statements (EIS) may be required prior to permit decisions. The following categories of assessment are included in an EIS:

1. environmental impact of the proposed action;
2. any adverse environmental effects that cannot be avoided;
3. alternatives to the proposed action;
4. the relationship between short-term uses and long-term productivity; and
5. any irreversible or irretrievable losses of resources. (Boschken, 1988).

Large scale development plans, such as port expansion programs, almost always require an extensive EIS. In addition, many states have passed their own environmental assessment laws based on NEPA.
The Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (16 USC Section 1451, et seq.), administered by the National Oceanic and Atmospheric Administration (NOAA), provides incentives for states to voluntarily develop and implement state coastal management programs. Start-up funds are provided and, under Section 307, federal activities, including permit decisions, must be consistent with approved state coastal management programs. Unlike the aforementioned pieces of federal legislation which focus on specific activities, state coastal management programs generally apply over a designated geographical area, "the coastal zone". The COE must respect a state's approved management plan and fully consider the comments of relevant state coastal agencies in permit decisions.

The Endangered Species Act

The Rare and Endangered Species Act of 1973 (13 USC 1536) requires that activities requiring a federal permit be harmless to endangered or threatened species and their habitats. It is administered by NMFS and FWS (AAPA, 1986). This piece of legislation becomes important to ports and other permit applicants when a threatened or endangered species' habitat is in an area of proposed development. Both Port Everglades, Florida, for manatee, and the Port of Los Angeles, for the least tern, have been confronted by problems associated with conflicts between the Endangered Species Act and development plans and have had to modify plans
accordingly (Boschken, 1988; and, Marti, class lecture, University of Rhode Island, Spring, 1988).

The Ocean Dumping Act

Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (P.L. 92-532), known as the Ocean Dumping Act, requires COE permits for the transportation of dredge spoils for the purpose of ocean disposal. Disposal sites are selected in accordance with EPA guidelines (AAPA, 1986).

The U.S. Army Corps of Engineers

Since the early 1970s, COE responsibility for maintaining the nation's waterways has broadened to meet new legislative requirements and subsequent judicial interpretations. Vested with Section 404, Section 10 and Section 103 permit authority, the COE is the lead federal agency regulating and managing waterways and wetlands. Under the terms of the FWCA, the COE's lead agency role requires it to consult with FWS, NMFS, EPA, any other relevant federal resource agency and state resource agencies in its environmental review of proposed projects. By virtue of Memoranda of Agreement between federal agencies, "the Corps will not end the review process and issue construction permits to itself or the port [or any other permit applicant] before all agencies covered by the memoranda have reviewed and accepted the development proposal and agreed to mitigation and compensation measures" (Boschken, 1988, p. 92). The COE must review planning and regulatory activities
of state and local governments as well as the comments of FWS and NMFS in permit decisions (Hershman and Kory, 1988). The COE must also adhere to water quality guidelines issued by the EPA. While its role is foremost in permit decisions, the Corps does not act alone in permit decision making.

The Environmental Protection Agency

The nation's environmental agency is responsible for assessing environmental impacts of proposed Corps-permitted activities and for providing criteria for water quality standards which must be met before a permit can be issued. Under Section 404(c), the EPA has veto authority over Corps permits issued over the agency's unresolved objections.

The U.S. Fish and Wildlife Service

The FWS, a branch of the Department of the Interior, is the primary federal agency charged with protection of the nation's fish and wildlife resources and their habitats. Generally, these resources are associated with fresh water. Under the FWCA, the FWS has an advisory role in permit decisions. The FWS reviews proposed projects for impacts on fish and wildlife and recommends mitigation when impacts cannot be avoided. While FWS recommendations are incorporated into the Corps review, they are not required to be included in permit conditions. The FWS can appeal Corps permit decisions when there are unresolved objections.
National Marine Fisheries Service

The authority of NMFS parallels and, at times, overlaps that of the FWS. The agency is charged with development, allocation and protection of the nation's marine fisheries resources including habitats. As a commenting agency, NMFS responsibilities under permit review procedures are similar to those of FWS.

State Government

Resembling the federal government, states have a number of agencies and laws affecting coastal and wetland management. Among those involved in management decisions are wetland regulatory divisions, state water quality agencies, coastal zone management agencies, fish and game authorities, conservation groups, transportation departments, and parks and recreation authorities. States have their own sets of regulations and permit requirements designed to implement specific state legislation which stipulates the roles of various state environmental and resource agencies. A permit applicant must comply with state regulations regardless of compliance with federal regulations.

Section 401 of the CWA and Section 307 of the CZMA both provide the state with an opportunity to participate in the federal permit process. Under Section 401, the state must certify compliance with state water quality standards prior to the issuing of a COE Section 404 permit. The state may require mitigation in the certificate or request special conditions through the COE public
notification process (AAPA, 1986).

In states with approved coastal management programs, Section 307 of the CZMA requires federal permit applicants to provide a statement of consistency with the state's program. The state may impose mitigation requirements or deny permits based on its own management plan which may extend beyond the scope of federal requirements. A public notification process similar to that conducted by the COE is required and often occurs simultaneously with the federal process.

In cases where state fish and game, parks and recreation, conservation, or other involved agencies are dissatisfied with COE permit conditions, a request may be made to the state water quality or coastal management agency to add conditions to the permit. These agencies also have the option of appealing to the Governor who may request elevation of a permit decision to a higher Corps authority.

Local and Regional Government

In addition to federal and state requirements, permit applicants may be subject to regulations promulgated by local or regional land use or planning agencies. Generally, regional and local regulations reflect the long-term environmental and economic goals of an area. State coastal management programs also may be administered on a regional basis.
"For at least ten centuries seaports have been viewed as entities responsible to the public interest" (Olsen, 1988, p. 311). In the U.S., ports do not function as traditional public agencies. Most major ports in the U.S. exist as quasi-public entities functioning under a Port Authority whose members may be elected or appointed. Port authorities serve a range of functions and may have jurisdiction over a single port or operate on a statewide or bi-state basis. The traditional functions of ports have been to provide national defense and facilities and services for waterborne trade. In addition to these basic functions, Port Authority functions may include the development of public transit facilities, airport operations and land management (Hershman, et al., 1988). In the past few decades, with the introduction of new shipping technology and the enactment of major environmental regulation, environmental protection and planning have been added to the list of port functions (Wessel and Hershman, 1988).
The Port Authority runs the port as a public corporation and must compete with other ports within the region and nation to attract carriers and cargo. The Port Authority's role has been called a "hybrid of government and business" (Hershman, 1988, p. 13). To a large degree, ports operate as autonomous enterprises with statutory authority and a legal personality of their own. As such, public ownership and market orientation meet to create a unique public enterprise (Olsen, 1988).

The 1960s and 1970s were years of rapid technological change in the shipping business. Container ships which emerged at this time and the larger ships that have followed require deeper channels, greater backup and storage space, and marginal wharves (Hershman, et al., 1978). Prior to the container revolution, most harbor channels were of a depth of forty feet or less and finger piers, which require significantly less space than marginal wharves, were used (Boschken, 1988).

As ships and ports have grown in size, regional competition among U.S. ports has grown so that ports must now compete within a much larger region. In many cases, it has become more efficient for ocean carriers to call at one large port and then rely on inland transportation for transshipment of cargo, rather than calling at a number of ports. "Port authorities, accordingly, have been thrust into entrepreneurial competition, each striving to provide better harbor service, inland connections and storage facilities" (Kagan, 1991, p. 314).

Competition for cargo demands that ports expand and update
facilities. In order to provide this higher level of service, ports have undertaken expansion activities which require the dredging of deeper channels to meet the needs of larger ships and the filling of areas to accommodate greater demands for space. Dredge activities are also required for routine maintenance of channel and berth depths.

Dredge and fill activities carried out by ports may pose a number of threats to the environment. "Dredge-and-fill projects change the patterns of water circulation, introduce heavy suspended sediments which eventually smother aquatic plants and shellfish beds, and completely destroy some habitats by dredging out, filling over, or releasing toxic substances into them" (Boschken, 1988, p. 31). For decades, the environmental impacts of dredge and fill activities have been ignored.

Concurrent with these developments in the port industry, the scope of regulation over dredge and fill activities has broadened significantly. During the 1960s and 1970s, traditional COE regulatory authority over dredge and fill activities was expanded to require that environmental impacts be balanced against the public benefits of a proposed activity. "The public was no longer concerned only with commerce and economic prosperity. Amenities such as fish and wildlife, clean air and water, access to the waterfront, and view protection took on greater importance, and the regulatory framework reflected this change. Federal resource agencies were given a voice in the COE permit process and the growing scarcity of urban waterfront land led regional and local planners to demand that recreational uses of coastal areas be weighed against port uses"
(Wessel and Hershman, 1988, p. 253). It was a time when the external costs of pollution and environmental degradation associated with port development activities began to shift from the public, which had previously borne them, to the port (Boschken, 1988). Prior to the implementation of new environmental legislation, ports had been allowed to dredge and fill areas with little encumbrance. "Harborside marshlands were viewed not as ecologically valuable habitats and buffers against erosion but as nuisances to be abated as soon as money for dredging and landfill could be raised" (Kagan, 1991, p. 313). As a result of new legislative requirements, a multitude of agencies and interest groups now have a direct influence on port planning.

In view of the competition generated by containerization, long-term planning has been adopted as a policy and incorporated as an administrative function at most major U.S. ports. Whereas few ports had large planning staffs in the 1970s (Hershman, 1978), the 1980s and 1990s have been a time when "long[-]term planning is no longer a luxury but a necessity" for ports (Hershman, 1988, p. 19). An integral part of long-term planning at ports, and, at times, the motivating factor to developing such plans, are environmental concerns. Requirements associated with the permit process often take years and in an industry where there is a "premium on speed", ports are attempting to incorporate environmental and regulatory requirements into long-term business plans (Chasan and Dowd, 1988, p. 238).
Ports and the Permit Process

In the late 1960s, when containerization was new, you could plan and build a new container terminal in a matter of months. Now it takes years” (Chasan and Dowd, 1988, p. 238).

Today, ports must integrate a myriad of regulations into planning and development decisions. Since dredge-and-fill activities are required not only for port expansion and development projects, but also for routine port maintenance, ports are intricately and consistently involved in the permit process. The majority of port permit applications involve Section 10, Section 404, and related state requirements.

The Corps permit program is designed to ensure:

1. that the nation's water resources are safeguarded;
2. that the nation's water resources are used in the best interest of the public; and,
3. that the environmental, social, and economic concerns of the public are considered (Dept. of Army, July, 1990).

While port projects have historically been deemed to be in the public interest, competing interests in coastal areas have led to a permit review process that seeks to balance economic and environmental concerns. In making its "public interest" determination prior to issuing a permit to dredge or fill, the Corps must weigh,

"All factors which may be relevant to the proposal...including the cumulative effects thereof:
among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people" (33 CFR 320.4 (a) (1)).

(Kagan, 1988, p. 319). In addition to the public interest review, permit applications must also be evaluated for conformity with Section 404(b)(1) guidelines supplied by the EPA. Among the criteria which must be met to comply with the 404(b)(1) guidelines are:

1. "there must be no practicable alternatives that would have less adverse effect on the aquatic environment;
2. the discharge must not result in significant degradation of the aquatic ecosystems;
3. the discharge must include all practicable measures to minimize potential harm to the aquatic ecosystem; and,
4. the project must be located in the aquatic environment to accomplish the intended objectives" (AAPA, 1986, pp. 33-34).

Additionally, states must issue a water quality certificate as required by Section 401 of the CWA and, under the terms of Section 307 of the CZMA, a statement of consistency with any federally approved coastal zone management plan (AAPA, 1986). Only after it has been determined through the permit review process that 404(b)(1) criteria have been met, that the proposed activity is not contrary to the public interest, that the proposed project meets EPA water quality criteria, and that the proposed activity is consistent
with the state's coastal management program and water quality standards can a permit be issued.

Corps permits are required for all projects that affect the navigable waters of the U.S. (broadly defined to include wetlands), involve the transportation of dredged material for ocean disposal, threaten impact to endangered species or involve the discharge of fill material into waters of the U.S. including wetlands. In addition, each state has its own regulations and permit requirements which may exceed or include a wider scope of activities than federal requirements.

In regulating dredge and fill activities, the Corps distinguishes between two categories of permits. The first of these is a general permit which applies to activities that are similar in nature and cause minimal environmental impact. The two types of general permits are nationwide permits and regional permits. Nationwide permits are for specific minor projects such as aids to navigation, backfill and bedding for utility lines and minor road crossings. Regional permits are permits that are authorized by the Corps on a regional or state level. It is the second category of permits, individual permits, that is the focus of this section. Individual permits are required for projects that do not meet general permit criteria (Dept. of the Army, 1990).

The permit process can begin informally years before an actual permit application is made. In the pre-application phase, a developer may consult with the COE and those agencies and interest groups who will later comment on permit applications. This allows the
developer to identify areas of concern and integrate those concerns into final design proposals.

Once a permit application is received by the Corps, the official permit process gets underway. Permits are reviewed according to specific criteria contained in the Corps' public interest review procedures (33 CFR Sect. 325) and EPA's Section 404(1)(b) Guidelines (40 CFR Sect. 230). In cases where there are expected to be significant impacts due to the proposed project, work on a draft Environmental Impact Statement may commence. Under the terms of the CWA, the Corps must issue a public notice within 15 days of receiving a permit application. The Corps notifies federal and state environmental agencies and the concerned public of all proposed activities requiring a permit. At the same time, the state public notification process required in the CZMA may also get underway. Most state agencies have agreements to act jointly with the Corps in the public review process (AAPA, 1986). Basic information on the proposed project is provided by the applicant and is incorporated into the public notice.

Following the issuance of the public notice is a public commenting period which is usually 30 days, but can be 15 days for noncontroversial projects or longer for controversial projects. During this time, any number of federal, state and local environmental agencies, private interest groups and individual citizens may comment on the proposed activity. If an EIS has been required, a draft will be circulated to all relevant agencies (Kagan, 1991). The comment period can be extended and the Corps may
consider any responding comments to the public notice received up until the time the permit is actually signed (AAPA, 1986).

The public notice period is followed by a review and evaluation of the proposed project. Prior to issuing a permit for dredging or filling, the Corps is legally required to consult with FWS, NMFS, EPA, the relevant state Department of Fish and Game, the relevant state water quality agency, and any state Coastal Zone Management Agency (Kagan, 1991).

In evaluating Section 404/10 permit applications, the Corps, in consultation with commenting agencies, first determines that potential impacts have been avoided through the selection of the least damaging practicable alternative. Practicable is defined as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (Dept. of Army/EPA MOA, 1990). Permits will be denied if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. It is presumed that alternatives exist for non-water dependent activities and will have less impact. If it is determined that the impacts are too significant, the permit can be denied, in spite of a lack of alternatives. (40 CFR Section 230.10).

Once it has been determined that impacts have been avoided to the maximum extent practicable, the next step in the Corps process is to minimize the impacts of the proposed project. If appropriate and practicable, impacts are minimized through design
modifications and permit conditions.

After impacts have been avoided and minimized, a plan to compensate for unavoidable impacts must be developed. Federal and State agencies, by the authority of the FWCA and the CZMA may, at this time, recommend specific mitigation as a condition of permit issuance. Compensation may be achieved through the restoration, enhancement or creation of habitat. Generally, in-kind (i.e., similar to lost habitat) over out-of-kind (different habitat) and on-site over off-site habitat replacement is preferred. Restoration and enhancement opportunities are considered before habitat creation projects and preservation of an existing habitat may be used as compensation in only exceptional circumstances (Dept. of Army/EPA MOA, 1990).

Compensation required to offset impacts of a proposed project is determined on the basis of the values and functions of the impacted area and the area of proposed compensation (the mitigation site). Functional values are determined using "assessment techniques generally recognized by experts in the field and/or the best professional judgment of federal and state agency representatives, provided such assessments fully consider ecological functions included in the Guidelines" (Dept. of Army/EPA MOA, 1990, p. 5). A minimum of one for one functional replacement (i.e. no net loss of values) with provisions for a margin of error is required and, in the absence of a detailed functions and values assessment, a minimum of 1:1 acreage replacement is required.

A final EIS based on the input of commenting agencies is
prepared. At any time during the process, a public hearing may be requested. The Corps is not obligated to grant all requests for a public hearing, but if public hearings are deemed necessary, a permit decision cannot be made until the hearings are held. At public hearings, locally affected interests, including fishermen, neighborhood groups, environmental advocates and municipal officials can comment on plans (Kagan, 1991). A state water quality certificate, or a waiver and a certificate certifying consistency with a state's approved coastal management plan are required before the Corps can issue a permit.

A decision to issue, conditionally issue, or deny a permit is made with the concurrence of all commenting agencies. Conditions may be attached to the permit as mitigation requirements. If the applicant agrees to the terms of the permit, then the permit is issued. The Corps has legal authority to enforce compliance with permit conditions. The Corps is not required to take enforcement action when noncompliance is discovered, but has discretionary responsibility to initiate enforcement actions.

Problems faced in the Permit Process

Permits for port expansion projects rarely follow the routine permit process (AAPA, 1986). Potential delays in development exist at every point within and outside of the permit process for ports and other permit applicants. There have been countless complaints, ranging from generic to specific port activity-related problems,
about the permit process as it now operates. Given the complexity of the regulatory process and the scope of port expansion plans, it can take years for a proposed project to receive approval.

The port must show that the proposed project avoids and minimizes impacts to the maximum extent possible and then carry out mitigation to compensate for those impacts. This process involves intense negotiation which encourages conflict. In addition, the threat of litigation has caused port authorities and participants in the regulatory process to proceed cautiously and thoroughly with permit applications (Kagan, 1991).

One problem associated with the permit process is the "fragmented, adversarial, and legalistic decision making system imposed by the current regulatory process" (Kagan, 1991, p. 315). The permit process does not encourage cooperative regional planning among agencies but, rather an antagonistic case-by-case approach where each party represents distinct interests and, at times, conflicting policy objectives (Shelley, Feb. 28, 1990). Unlike other federal programs, Section 404 is administered by two federal agencies, the EPA and the Corps. Proposed projects must receive approval by local, state and federal agencies and can become hung up by any one of these agencies. Approval by one agency does not preclude the imposition of design modifications and additional mitigation requirements by another agency.

"[I]n some cases the chief problem is the number of relevant but often competing programs that reflect a wide variety of values and purposes. No single agency is likely to have complete or final authority
over wetland use decisions. Overlapping programs often require multiple permits with multiple reviews. A positive signal from one agency may be followed by a contrary response from another. In the meantime any construction planning is stymied" (National Wetlands Policy Forum, 1988, p. 36).

An example of the type of delays associated with this fragmented regulatory approach can be seen in the case of Paxport Mills Inc., Commencement Bay, Washington where a speedy and uneventful state permit process was followed by lengthy negotiations at the federal level. Mitigation for the project was not proposed until fourteen months after the Corps permit application was made and the final Corps permit was not issued until two years and seven months after application. This followed a state permit processing time of approximately four months. Given the ease with which Paxport Mills received state permits, it would have been difficult to predict the problems encountered in the federal permit process. (Wessel and Hershman, 1988).

Related to the problem of fragmentation of the permit process is the problem of reconciling permit conditions of a variety of agencies. Local groups may require development plans to be integrated with long-term regional goals. The Section 404 program, however, is seen as contrary to comprehensive land use planning since reviews are based on a project-specific, case-by-case basis.

"[The] tension between the federal and local permitting processes leads to duplication of effort, confusion, and delay. Permit applicants must either go through with two separate approval processes and face the likelihood of inconsistent results, or attempt the difficult task of bringing federal and
In cases where private citizens, environmental groups, or local politicians feel the Corps or any other agency has not met its legal obligations in the permit process, litigation may arise and delay development or mitigation projects. An example of the type of delays associated with legal battles can be seen in Oakland, CA where, after four years of trying to receive permission to dredge, the harbor remains undredged and the Port continues to lose market share to deeper, more accessible competitors.

"After three compendious, expensive environmental impact analyses and four years of regulatory review, there has been no authoritative, comprehensive determination concerning the least environmentally harmful, economically feasible site for disposal of dredged sediments. Instead, a cascading jumble of regulatory agencies, interest groups, and courts dealt with the issue sequentially, each viewing it through a particular set of legal lenses" (Kagan, 1991, p. 324).

Delays are also being experienced by the Port of Los Angeles due to litigation involving its Batiquitos Lagoon mitigation site. In this case, the Sierra Club is suing the port over a proposed mitigation plan with which virtually all the resource agencies have agreed. After years of planning and design modifications, the restoration project at Batiquitos Lagoon remains unimplemented. A similar situation was also experienced by the Port of Seattle where a lawsuit initiated by a community organization delayed dredging and resulted in design modifications and additional mitigation costs (Kagan, 1991, p. 327).
Another category of problems which results in development delays and increased costs for ports is the negotiation and implementation of appropriate mitigation. In the interest of expediency, a port or other permit applicant may agree to expensive and possibly excessive mitigation requirements to prevent conflicts and delays. Such was the experience of the Port of Oakland.

"The Port of Oakland agreed to pay for successively more expensive disposal methods, even in the absence of any definitive official determination that less expensive methods would create significant environmental harms. Port officials did so simply to avoid further regulatory and legal delays that might cost it the patronage of important shipping lines. Thus the extortative pressures engendered by litigation and regulatory procedures, not rational economic and environmental analysis, dominated proposals for siting the first half million yards of sediment" (Kagan, 1991, p. 326).

In the case of the Port of Miami, uncertainty associated with technical aspects of the mitigation effort, which involved planting 251 acres of seagrass to compensate for the impacts of dredge and fill activities in Biscayne Bay, resulted in unforeseen problems and considerably increased costs for the Port (Wessel and Hershman, 1988). As in many cases, the permit applicant agreed to mitigation plans simply to expedite the permit process, rather than as a means to achieving a national goal to protect wetlands (Zagata, 1988).

Lack of uniform mitigation requirements is also considered a problem. Section 404(b)(1) guidelines provide no specific criteria to be used in determining appropriate mitigation. As a result, it is extremely difficult for developers to incorporate mitigation costs
into development budgets. Aside from creating conflict among developers, regulators and interest groups, this lack of standards and predictable mitigation costs hinders long-term port planning.

Generally, the application of broadened permit requirements to port activities has been hostily received by ports. As noted, prior to the late 1960s, ports operated with little restriction on dredge and fill activities. Since then, major permit and mitigation requirements have become routine for port development activities.

"From a port authority's point of view, environmental reviews and requirements lead to increased planning and design expenditures, additional investments for environmental controls, increased operating costs, added administrative expense for intergovernmental negotiation, 'costs of delay', during periods of high inflation, and the 'opportunity costs' of lost revenue from delay - all of which often are interrelated and increase the complexity of strategic planning and project development" (Boschken, 1988, p. 32).

Permit requirements and conditions can substantially hinder a port's ability to respond to market demands. Given the complexity of port expansion projects and the opportunities for delay in the permit process, it has become increasingly important for ports to incorporate mitigation plans into development proposals that are based on long-term community goals. One method that has been proposed is the use of mitigation banks to compensate for environmental losses. The subsequent Chapter describes the concept of mitigation banking and its potential use as a planning tool for ports as well as other Section 404/10 permit applicants.
CHAPTER FOUR
MITIGATION BANKING

Background

The concept of mitigation banking was developed in response to the growing and ongoing need to compensate for unavoidable losses associated with development. Mitigation banking is defined as formally undertaking steps to create, restore or enhance habitat for which credit is earned in anticipation of future requirements to compensate for unavoidable losses associated with development. Benefits to habitat are quantified as credits, deposited into an "account", and saved until compensation for losses to similar habitats is required. When losses are determined to be unavoidable and have been minimized to the maximum extent, credits may be debited to meet the mitigation requirements of a permit.

The idea of mitigation banking is credited to then Congressman John Breaux of Louisiana, where the establishment of the Tensas River National Wildlife Refuge in 1980 was intended to act as a mitigation bank for a number of public works projects. Under the terms of the agreement, each preserved acre in the Refuge was
traded for an acre of lost wetland habitat. Except in extraordinary cases, where the preserved habitat is in imminent danger of destruction, preservation of this type should not be considered a mitigation bank since it violates the very goal of mitigation which is to offset environmental impacts while maintaining the productive capacity of the nation's wetlands. The attempt, however, did act as a springboard for the evolution of the concept and the implementation of a growing number of mitigation banks (Boesch, 1987).

"It was thought that, properly implemented, mitigation banking could be an innovative mechanism to obtain compensation for unavoidable habitat losses primarily associated with wetland resource development projects regulated under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act" (Short, 1988, p. 2).

Another impetus for pursuing the concept of mitigation banking was that it provides an opportunity to remove the negotiation of mitigation projects from the permit process. Once unavoidable losses are determined and minimized, and a decision to require compensation is made, banked credits may be used, provided the resources and habitats of the impacted area are eligible for compensation from the bank. Theoretically, the permit processing time may be reduced because negotiation and implementation of compensatory mitigation projects can be achieved prior to the permit application.
The Mitigation Bank Agreement

Participants in the negotiation of mitigation bank agreements may include the FWS, NMFS, EPA, the Corps, state and local resource and planning agencies, and developers or other permit applicants. Prior to negotiation of the actual bank agreement, potential bank sites which emphasize in-kind replacement, i.e., replacement of similar biological and physical resources, for losses associated with future development are identified and reviewed. Once an appropriate site is selected and arrangements have been made to acquire the land (if necessary), a detailed development plan for the mitigation site must be produced.

While specific elements may vary among mitigation bank agreements, the identification of specific items has been suggested as critical to the successful implementation of mitigation banks:

1. Members of the interagency team and their obligations under the agreement must be defined.

2. The purpose and specific goals of the bank must be outlined and placed in the context of local or regional comprehensive plans.

3. A description of the mitigation plan, including the agreed upon evaluation procedures, must be provided.

4. A program for monitoring and evaluating the bank must be included and responsibilities for these
procedures assigned.

5. Types of losses to habitat eligible for bank credit must be identified and geographical boundaries established for credit use.

6. The life and size of the bank must be defined.

7. Provisions must be made to establish legal title to the bank area both during and after the life of the bank. (Boesch, 1987; Short, 1988; and Zagata, 1988).

Bank agreements, once negotiated, are typically formalized through a Memorandum of Agreement (MOA) or Memorandum of Understanding (MOU) among principal parties. Though often time-consuming, the negotiation of a solid agreement is essential for the success of the bank. "The formal banking agreement ideally reflects a clear understanding of bank formation, structure, implementation, and operation" (Short, 1988, p. 11). Some bank agreements may be broadly written to allow flexibility, but require that specific criteria be included as conditions on permits issued for the construction of bank areas.

A key point in any mitigation agreement is the procedure for evaluating habitat and resource value. Bank agreements should include a methodology for determining, quantitatively, impacts on resources. The method must be technically feasible, replicable, and consistently applied so that both credits and debits can be determined uniformly (Soileau, 1985). In cases where a method for quantitatively determining resource values and functions is not available or impractical, the method to be used should be included in
The evaluation procedures most commonly used by current mitigation banks are based on Habitat Evaluation Procedures (HEP) developed by the FWS (Boesch, 1987). In application, a habitat suitability index (HSI) for each of a representative number of species is multiplied by the number of affected acres to establish a figure of habitat units (HUs). For example, if the HSI for a species at a particular site were determined to be 0.7 (on a scale of zero to one), and proposed development would reduce this index to 0.3 over an affected area of ten acres, the developer would have to mitigate for the four HUs lost for that species. If appropriate, the number of credits equaling four HUs can be subtracted or withdrawn from the mitigation bank. Generally, HUs are summed for all species and habitats to get a "bottom line" result. Another accepted evaluation technique for determining wetland values is the Wetlands Evaluation Technique (WET2) used by the Corps. This technique is specifically designed for evaluating numerous wetland resource values (unlike HEP which evaluates wildlife habitat resource values alone) and has not been used extensively.

A modified version of specific evaluation methodologies is often used since evaluation models for important wetland species may not be available or practically applied to a specific area. It should be noted that HEP and modified evaluation procedures based on HEP consider only habitat value and do not take full account of the entire range of wetland values.
Potential Advantages

A number of advantages of mitigation banking over the traditional approach of negotiating mitigation within the permit process have been suggested. While research confirming these advantages has not yet been conducted, several potential advantages have been identified.

By definition, a mitigation bank puts the negotiation and implementation of compensatory habitat restoration, enhancement or creation in front of the permit process. This allows developers and local, regional and state planning agencies to work together in determining realistic long-term goals which allow development to coexist with protection and improvement of the environment. Since regulators and developers have a vested interest in seeing successful mitigation, the regulator for improvement to the environment and the developer for earned credits, both have an incentive to ensure good planning of mitigation banks. Conflicts, as a result, may be minimized. The developer (and regulator) is released from the pressure of negotiating mitigation while a much-needed permit is held up.

Conflicts may further be minimized in the permit process through the use of banks by requiring local and regional planning groups to sit down with developers and work out long-term economic and land use goals. In negotiating the mitigation bank
agreement, difficult issues with regard to future development in an area must be addressed. Mitigation banks can be designed to meet the long-term environmental and economic goals of a region. The opportunity exists for cooperative regional planning and the unpredictability of regional planning policies is reduced.

As a result of mitigation up-front, a shorter permit processing time is expected. Agencies who are party to the agreement may accept bank credits as appropriate mitigation for project related impacts and, in so doing, reduce the often time-consuming need to negotiate compensatory mitigation. The possibility of streamlining the permit process has been one of the primary reasons developers have supported the concept of mitigation banking (Short, 1988).

Another set of advantages associated with mitigation banking is environmental. Since banks are created and implemented prior to permit related activities, theoretically, there is at no time a loss to the resource base. Under the current permit process, the time lapse between environmental loss and fully functional replacement can be considerable, if achieved at all (Short, 1988). While stricter guidelines are being applied to ensure that mitigation is in place prior to the commencement of permit activities, the time lapse remains significant. The success of mitigation efforts, or lack thereof, is unacceptable for achieving a goal of no net loss. Intrinsically, as long as a credit balance exists for the bank, there is an overall benefit to the environment. At the time of dissolution of the bank, the resource base should, at least, be where it was prior to the bank's inception.
A second potential environmental benefit is improved monitoring and evaluation of mitigation sites. Since the developer must show quantifiable environmental improvement before credits are earned, problems associated with noncompliance with permit conditions are minimized. Earned credits can become collateral to ensure predicted outcomes are achieved and that banks are successful over time.

In addition to the environmental advantages, a number of potential economic advantages of mitigation banking over traditional approaches to mitigation have been suggested. In terms of construction costs, the opportunity may exist to take advantage of economies of scale in mitigation projects. While it may be prohibitively expensive for developers to mitigate for individual losses associated with minor projects, "the cost per acre drops markedly when a large project is undertaken and thus the ecological benefit per dollar spent increases" (Zagata, 1985, p. 479). Considering the current situation, which one member of the regulatory community has described as "often spending $1.00 for environmental protection and getting about 15 cents worth of environmental benefits" large-scale mitigation projects may potentially reduce the costs and regulatory agency workloads by consolidating mitigation requirements to a single site (Kagan, 1991, p. 328).

Mitigation banking may provide the developer with an incentive to enhance public values by placing an economic value, as opposed to a cost, on mitigation projects. Bank credits become assets for industries and, in some cases, can be sold or traded (Zagata, 1988).
Developers may also receive recognition for successful large mitigation projects and improve their public image.

Finally, mitigation banking provides developers with an opportunity to internalize the cost of mitigation projects. Rather than facing unknown mitigation costs with each permit application, costs associated with compensatory mitigation can be budgeted. Instead of being a type of surcharge placed on development, mitigation can become a known cost of doing business.

Potential Disadvantages

On paper, mitigation banking seems to offer a number of administrative, environmental and economic advantages over the traditional approach to mitigation for both developers and the regulatory community. In practice however, several potential problems and drawbacks have been suggested.

Mitigation up-front of the permit process may not facilitate and can often complicate the negotiation of mitigation projects. While removing negotiation of mitigation from the permit process may take certain pressures of time off of developers and regulators, the negotiation of bank agreements can be extremely time-consuming. Since consensus-oriented planning tends to postpone action (Kagan, 1991), it can be very difficult to negotiate and implement a bank plan within a justifiable time span. A high investment in terms of dollars and man hours is required by all parties to the agreement with no guarantee that, in the long-run, the bank will be feasible or
an agreement will be reached. This type of problem was experienced in Oregon where the Port of Astoria and the Columbia River Estuary Study Taskforce spent a great deal of time and effort developing a plan which turned out to be unimplementable at that time due to higher than estimated costs (Wessel and Hershman, 1988). When attempting to develop a mitigation bank agreement, all participating parties gamble that the expense and effort will pay off and a successful bank will result.

While mitigation banking may lead to better mitigation project planning, there is a fear that, with the existence of a mitigation bank, the quality of development project planning will suffer. "A major risk involves the possibility of neglecting good project planning and resorting to the use of banked credits before all means of avoiding and minimizing impacts have been exhausted (Soileau, 1985, p. 473). Furthermore, mitigation banking can be seen as buying permits and therefore, diminish public opinion of the developer. A safeguard to the possibility of poor project planning has been suggested. As of 1988, the Corps was not a party to any mitigation bank agreements (Short, 1988). Ultimately, permit decisions remain outside the purview of banks. The potential problem arises in the review process where the fear is that commenting agencies will evaluate proposed activity less rigorously and the least damaging alternative will be neglected.

Another potential disadvantage associated with wetland mitigation banking that has been suggested is somewhat philosophical. Approval of the concept of mitigation banking carries
with it an acceptance of future wetland losses. Taking this one step further, in cases where credits can be bought and sold, a market is created which may encourage future wetlands losses.

The problem of a net loss in wetlands habitat in terms of both values and acreage remains. Unless successful measures are undertaken to create or restore wetlands, development will either have to halt or losses will continue.

Ports and Mitigation Banking

In addition to the general benefits suggested in association with mitigation banks, there are several particular reasons why ports are good candidates for sponsoring mitigation banks. The opportunities for on-site compensation are extremely limited for ports. Compensation for habitat losses within port boundaries necessarily restricts future port development (Marcus, 1987). For this reason, ports are forced to focus on off-site mitigation (Knatz, 1987). Similarly, the opportunities for in-kind mitigation are constrained by the types of habitats lost as a result of dredge and fill activities. Generally, losses in marine habitat cannot be fully replaced with in-kind habitat. Instead, mitigation efforts have been directed at saltwater wetland habitats.

Port projects are often deemed to be in the public interest in spite of unavoidable habitat losses. Alternative sites for port development usually do not exist. It follows that compensation for environmental losses is often a condition of permits. Mitigation
banking offers ports an opportunity to consolidate compensation requirements and incorporate mitigation through compensation into long-term port plans.

Mitigation banking allows ports to work with local and regional authorities in developing nonconflicting environmental and economic agendas. The development of a mitigation banking agreement forces all parties to articulate specific objectives and reach compromises. Everyone has to lay their cards on the table and then develop some type of consensus. While this is by no means an easy process, uncertainty with relation to regional goals, including the role of the port, is reduced. Opposition to permit applications for projects included in regional plans may also be diminished.

Mitigation banking offers ports, as frequent Section 404/10 permit applicants, a chance to consolidate mitigation requirements, incorporate mitigation costs into budgets, improve planning, and save money on mitigation projects. Perhaps the greatest potential benefit to ports, however, is the streamlining of the permit process. The port industry is highly sensitive to market demands and the speed with which a port can react to those demands can be a determinative factor in the choice of ports of call by ocean carriers.
CHAPTER FIVE
INVENTORY

Purpose

A major purpose of this thesis is to develop a current inventory of mitigation banks in the United States. Such an inventory has not been conducted since 1988 (Short, 1988). At that time, thirteen established banks and ten potential banks were identified. An earlier inventory conducted in 1985 identified eleven mitigation banks (Soileau, et al., 1985). Prior to evaluating the concept's potential future value, it is necessary to conduct a current inventory of mitigation banks throughout the U.S.

Hypothesis

It has been hypothesized that the number of mitigation banks throughout the U.S. has continued to grow despite a lack of comprehensive studies confirming the actual benefits of the concept. An increase in the number of banks would be consistent with the growth in the number of implemented banks experienced between 1985 and 1988.
Methodology

In the interest of consistency, the methodology used by Short in the 1988 inventory has been utilized. This methodology involves contacting FWS regional and field offices and questioning appropriate personnel. As a commenting agency for Corps permits, it was assumed that the FWS would be involved in most banking efforts or be aware of such efforts.

Initial contact with FWS personnel was made by mail on a regional level. Based on the results of initial correspondence, details on proposed and implemented banks were gathered through a series of telephone calls to FWS field offices, bank sponsors, and state resource agency personnel. Contacts and leads suggested by FWS personnel were pursued to the maximum extent practicable.

Organization

The inventory of mitigation banks has been broken down in two ways. First, banks have been broken down geographically according to FWS Regions (See Table 1). No banks were found in Region 2, the Southwest, and Region 7, Alaska. Banks have been further classified as implemented or nearly implemented mitigation banks, and potential mitigation banks. It was found that several banks, although not yet formally implemented, were very close to operation and would best be grouped with implemented banks. In many cases,
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<td>Wyoming</td>
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<td>South Carolina</td>
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<td>Mississippi</td>
<td></td>
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<tr>
<td>Arkansas</td>
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MOUs or MOAs for implementing the banks have been negotiated and are awaiting signature. There is no guarantee that these banks will be implemented, but indications are that they are likely to be implemented in the near future. Potential banks are also broken down into FWS Regions. Plans for potential banks have not reached the higher level of development that nearly implemented banks have reached, but are significant for future studies on mitigation banking.

Region 1

Astoria Airport Mitigation Bank

Background. The Port of Astoria signed an MOA with the Corps, EPA, FWS, NMFS, Oregon Department of Fish and Wildlife, Oregon Department of Land Conservation and Development, and the Oregon Division of State Lands in October of 1987 establishing a mitigation bank in Clatsop, Oregon. The mitigation project involved the restoration of tidal influence to a 33-acre site through the construction of dikes, islands and tidal channels. Credits generated by the restoration activities were established using a modified HEP analysis to compensate primarily for future port and harbor development activities between the tip of Tung Point and the west bank of the Skipanon River. The MOA does not limit bank use to port-related activities. The Oregon Division of State Lands owns, manages and is responsible for annual monitoring and evaluation of the bank site.
Under the terms of the bank agreement, credits may be purchased to compensate for other development projects located between the tip of Tung Point and the west bank of the Skipanon River. The present cost is approximately $4,500 per credit with one acre of mitigation having a relative value of one credit.

**Status.** This bank has not achieved anticipated results and is considered by some to be an expensive mistake. Although the bank has provided valuable habitat for birds and waterfowl, the bank site turned out to be an essentially freshwater marsh rather than a saltwater marsh, as had been envisioned.

The bank started with 80 credits and to date 10.59 credits have been used for one debit. There have been no debits to the bank for several years. The State of Oregon does not require compensation for subtidal areas and there have been no port development activities that could have fallen under the terms of the MOA since the original debit.

Recently, there has been some discussion of using the bank to compensate for impacts associated with the replacement of some piling piers. Should the port attempt to use bank credits in the future, important issues with regard to the failure of the bank to achieve its goals will have to be resolved. Some of these issues will be addressed this year in a five-year evaluation of the bank. Resource agencies and the Port of Astoria will be confronted with the fact that a sincere mitigation effort did not turn out as planned and that values created may not be appropriate to mitigate for port
related activities.

Sources.


Anaheim Bay
Background. A MOU to establish a 110-acre mitigation bank, made up of three parcels at the Seal Beach National Wildlife Refuge approximately ten miles south of the Port of Long Beach, was signed in February, 1986. The City of Long Beach Board of Harbor Commissioners, FWS, NMFS and the California Department of Fish and Game are signatories to the agreement. Restoration efforts involved excavation and improvement of culverts and channels to lower the parcels to shallow tidal and intertidal elevations. The bank land is owned by the U.S. Navy and is monitored and managed by the FWS as part of the National Wildlife Refuge system.

The mitigation bank was project-specific, as it was designed to meet the specific mitigation requirements of a 147-acre fill project to extend Pier J at the Port of Long Beach. Credits generated at the mitigation site using a modified HEP analysis and based on the consensus of an interagency team were used as mitigation for the Pier J project at a rate of one restored acre for every 1.32 acres filled. Excess credits were used for small fill projects within the
port.

**Status.** While some monitoring activities are occurring to confirm success of restoration efforts, the bank was designed to be finite and has ceased to exist. Values were preassigned and available for use as credits after construction. Cost per acre is estimated at $45,000 or $34,500 per acre with adjustment (1.32 acres of landfill for one acre restored). The bank performed as planned.

**Sources.**


**Batiquitos Lagoon**

**Background.** The Port of Los Angeles inherited the Batiquitos Lagoon restoration project from one of its tenants, Pac-Tex, Inc., which had lost its key permits to construct a pipeline from Texas to the West Coast. The Lagoon is located in the City of Carlsbad, Northern San Diego County, California and is approximately 90 miles from the Port. The Lagoon site is almost 600 acres, was dedicated by the Hunt brothers to the California State Lands Commission, and is now in a public trust. The land is leased to the California
Department of Fish and Game as an ecological reserve.

The Port will receive credit using a modified HEP analysis for restoration of 396 acres of intertidal and subtidal habitat and will receive no credit for enhancement of the remaining perimeter acreage. Extensive dredging, restoration activities and the creation of a fresh water wetland are planned.

Agreement has been reached for the Port to set up an escrow account in the amount of $8,000,000 for use by the California Department of Fish and Game to cover maintenance costs. A ten-year program for evaluation has been designed with the Port responsible for implementation. Evaluations will be conducted in years 1, 2, 3, 5 and 10 of the bank.

Status. Since the idea for a mitigation bank at Batiquitos Lagoon was conceived in the mid-1980s, it has been controversial. Designs for the mitigation project have been modified and the areas available for credit reduced. With the exception of the California State Coastal Commission, resource agencies have accepted the Batiquitos Lagoon project as reasonable mitigation for the Port. An MOU has been drafted by FWS, NMFS, CDF&G, California State Lands Commission, the City of Los Angeles, and the City of Carlsbad. The project is projected to generate 383 credits which will be subject to adjustment. Estimated cost to the Port, excluding maintenance is approximately $40,000,000. While not intended by the Port to be a project-specific bank, port mitigation needs associated with development plans for Pier 400 have now surpassed the credits which will be generated by the Batiquitos Lagoon restoration
project.

The California State Coastal Commission, by refusing to sign the agreement, will have the last word on the implementation and use of this bank. Nonetheless, mitigation project construction is expected to get underway in the Fall of 1993. It should be noted that the Port is currently being sued by the Sierra Club over the mitigation plan for Batiquitos Lagoon, based on the current habitat value of the area to certain species of ducks. Port development plans are now on top of mitigation plans and, after almost a decade of negotiation, the agreement remains unimplemented.

Sources.


Bracut Marsh
Background. A mitigation bank was established at Bracut Marsh, located at Humboldt Bay, five miles north of Eureka, California, through a 1981 MOU between the California State Coastal Conservancy and the California Coastal Commission. The 13-acre site is a former lumber yard and includes six acres of coastal wetlands and seven acres of riparian and upland habitat. Credits
were only available for the six acres of coastal wetlands and were based on a square feet of area restored.

The mitigation plan involved restoration of the site to tidal influence. Credits were used to mitigate for losses associated with the filling of pocket marshes in an industrial section of Eureka. The pocket marshes are no more than two acres, have been permanently isolated from tidal action due to past development and are considered to be of low resource value. The State Coastal Conservancy (SCC) sponsored the effort and owns and manages the mitigation site.

**Status.** A small credit balance exists for this bank. Over 95 percent of the credits have been purchased at a cost of $.75/sq. ft. with a minimum compensation of 1:1. No credits have been sold in the past three to five years.

There have been significant problems with this mitigation site. Areas which were intended to become salt water wetland have not achieved anticipated results. The SCC is spending an additional $60,000. on construction and planning to improve the site. Plans include the construction of a new breach dike in the northern half of the site. The bank represents an example of out-of-kind mitigation, as pocket marshes do not serve the same functions as the habitats created at Bracut Marsh.

There also have been major problems in the area of monitoring and evaluation of this mitigation bank. *Some of the problems with this bank might have been corrected earlier had there been monitoring from the first, rather than waiting six years to evaluate*
changes in the bank lands." (Short, 1988, p. 46). Although the bank was implemented in 1981, no evaluation took place until 1987.

As one of the initial efforts at mitigation banking, Bracut Marsh has experienced many of the growing pains associated with the evolution of this concept. Problems with monitoring and evaluation responsibilities and mitigation project planning, given today's level of knowledge, may have been avoided. The area of pocket marshes was zoned for development and an appropriate mitigation site, based on regional goals, identified. While restoration goals have not been fully achieved, the bank remains a valuable educational model for similar types of banks.

Sources.


Riddle, Elizabeth P. "Mitigation Banks: Unmitigated Disaster or Sound Investment." California State Coastal Conservancy (1986).


Cabrillo Marina

Background. A mitigation bank was established in 1984 as a means of addressing the results of a study which determined that there had been an historic net increase of almost 18 acres of open water habitat in the inner harbor area of the Port of Los Angeles. The bank was subsequently established through a MOU between the City of Los
Angeles Board of Harbor Commissioners, FWS, NMFS, and the California Department of Fish and Game, with a credit balance of 17.7 acres to be used to mitigate for small port fill projects on an equal trade-off of open water: fill basis. The bank can only be used to mitigate for small fill activities which result in losses to areas less than 4.8 feet above mean low water within the Port of Los Angeles. The Port is responsible for management and monitoring of the bank, which primarily involves keeping track of accounts, since no active mitigation project was undertaken.

**Status.** No additional credits have been added since the establishment of credits retroactively in 1984. The bank is still in existence and has a credit balance of less than an acre. It was last used about a year ago to mitigate for a small loss associated with the construction of a fire station at the Port. It is a fairly simple agreement that requires acre-for-acre compensation for losses to marine habitat and has been considered a successful group effort.

The Port of Los Angeles is currently considering using the bank for the West Bank Widening Project which will widen the channel to eliminate a safety hazard and, in so doing, will create an additional nine acres of marine habitat (open water). The proposal has not been finalized.

**Sources.**


Short, Cathleen. Mitigation banking. U.S. Fish and Wildlife Service
Beach Lake

Background. The California Department of Transportation (Caltrans) has acquired three sites at Beach Lake, totaling 142 acres, to provide rights of way for the construction of Interstate 5 in Sacramento County. Beach Lake is immediately south of Morrison Creek and approximately one half mile east of the Sacramento River. An excess of 135 acres is currently being leased for agriculture. Plans are to restore seasonal wetlands, permanent wetlands and riparian habitats for use as mitigation for future losses associated with highway project impacts in the lower Sacramento and upper San Joaquin Valleys. Restoration will be achieved through excavation and construction of water control structures. A monitoring program will follow "Planning Guidelines for Standard Approaches to Mitigation Site Monitoring and Maintenance" agreed to by Caltrans and FWS. Annual reports will be provided by Caltrans and success criteria will be included in the agreement. A qualified public or private organization will be contracted by Caltrans for day-to-day management of the bank site. Caltrans will retain ownership until the completion of performance goals at which time title will be transferred to an appropriate trustee agency or organization. An evaluation procedure to be used for crediting and debiting has not been determined.

Status. After acquiring the land for highway development purposes, Caltrans recognized the opportunity to use remaining acreage as a
potential mitigation bank site to compensate for future highway project impacts. Since then, Caltrans has engaged in negotiations with the FWS, the California Department of Fish and Game, the Corps and the EPA on the development of a mitigation bank agreement and has been studying restoration options. The Beach Lake Site, which is in close proximity to large tracts of conservation lands and the Sacramento County Mitigation Bank Site at Stone Lake, is considered a good candidate for successful creation of high habitat values. Restoration plans for the area are in the development stage and a preliminary MOU establishing the bank has been drafted. It is likely that implementation of this bank will require at least another year of negotiations.

Sources.


Newport Bay

Background. An MOU between the Port of Long Beach, FWS, NMFS and the California Department of Fish and Game, entered into in March of 1984, established a mechanism whereby credits generated, at a mitigation site in Newport Bay, and in excess of the mitigation requirements associated with the expansion of Pier J/Berth 83, could be banked for future use. After signing the MOU to establish this bank, the City of Newport Bay approached the Port with a plan for restoring a much larger area. In return for a total of $910,500,
the Port was able to turn over responsibility for the terms of the MOU to the City of Newport Beach. NMFS monitoring of the programs have been completed for the area.

**Status.** The restoration project at Newport Bay was completed in November, 1985. All bank credits have been used and the bank is now defunct. The bank was designed to be finite. In implementation, excess credits were used to mitigate for losses associated with the expansion of Pier J and agencies generally did not object to the use of bank credits. The average cost per acre was approximately $31,400. With adjustment for trade-off ratio (1 restored for every 1.5 acres filled) the average cost per acre was approximately $20,900.

**Sources.**


**San Joaquin Marsh**

**Background.** An MOA between the Irvine Co., FWS and the City of Irvine was signed in January of 1988 to establish a mitigation bank on a 20-acre parcel, made up primarily of riparian wetlands, at the
the Port was able to turn over responsibility for the terms of the
MOU to the City of Newport Beach. NMFS monitoring of the programs
have been completed for the area.

**Status.** The restoration project at Newport Bay was completed in
November, 1985. All bank credits have been used and the bank is now
defunct. The bank was designed to be finite. In implementation,
excess credits were used to mitigate for losses associated with the
expansion of Pier J and agencies generally did not object to the use
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$31,400. With adjustment for trade-off ratio (1 restored for every
1.5 acres filled) the average cost per acre was approximately
$20,900.

**Sources.**


Knatz, Geraldine. "Offsite Habitat Mitigation Banking: The Port of
Long Beach Experience." in Coastal Zone '87, Vol. 3 (1987): 2530-
2543.

Short, Cathleen. Mitigation banking. U.S. Fish and Wildlife Service
Biological Report 88(41), (1988).

**San Joaquin Marsh**

**Background.** An MOA between the Irvine Co., FWS and the City of
Irvine was signed in January of 1988 to establish a mitigation bank
on a 20-acre parcel, made up primarily of riparian wetlands, at the
San Joaquin Marsh located in the City of Irvine, California. The Irvine Co. owns the site. The mitigation bank plan involves the restoration of riparian wetlands through plantings. Since then, a larger restoration project, which would involve the entire 580-acre marsh site and a variety of habitats including riparian wetlands, uplands, ponds and a freshwater pond, has been proposed by the University of California, the City of Irvine and the State Coastal Conservancy. Surrounding developers, including the Irvine Co. would have an opportunity to meet mitigation needs through the purchase of credits.

**Status.** As a major landholder in the San Joaquin Marsh area, the Irvine Company chose the 20-acre site because it already owned the land. Plantings have been relatively unsuccessful. Growth has to be self-sustaining for five years prior to credit use. Irvine Co. has not been able to achieve this and is now considering joining the larger effort to restore the marsh.

**Sources.**

**Idaho Department of Transportation**

**Background.** The Idaho Department of Transportation (IDOT) has sponsored the implementation of a state-wide mitigation bank program in that state. There are currently three sites in the bank:
1. Old Beaver, 16 acres, established 1989;
2. Acequia, 28 acres, established 1991; and,
The Old Beaver Site is owned by the IDOT, the Acequia Site is owned by the Bureau of Land Management, and the Mud Lake Site is owned by the Idaho Department of Fish and Game. All of the bank sites involve fresh water wetlands. Mitigation activities involve restoration of scrub shrub wetland at the Old Beaver Site, construction of a wetland at the Acequia Site, and enhancement to prolong the growing season through diking at the Mud Lake Site. Depending on characteristics and size of site, a combination of HEP, WET2, and best professional judgment is used to determine bank credits and debits. The bank is designed to be used to compensate exclusively for losses associated with highway projects.

Status. A total of 12 agencies were involved in the early negotiation of a solid bank agreement which recognizes that credits will be used only as a last resort. While mitigation activities have been conducted, bank sites are still fairly new. An evaluation of bank sites and a HEP analysis is scheduled for Spring, 1992. Ongoing drought in the area may become a variable in determining the success of bank sites. One bank site has been used for credits, but balances are unavailable at this time.

Sources.

Aliso Creek Wildlife Enhancement Project information has been unavailable.
Potential Banks

Sacramento County. A potential 650-acre mitigation bank exists adjacent to the Caltrans Bank Site at the proposed Stone Lakes National Wildlife Refuge. The bank would be available to compensate for losses resulting from all types of development within Sacramento County. A restoration program is in the works.

Sources.

Placer County. The development of a mitigation bank for Placer County represents a case where an attempt is being made to tie regional development goals with regional environmental goals. Placer County is leading the effort to mitigate for losses to small areas considered to be of low resource value, but requiring mitigation nonetheless, by locating and developing a large area. The County anticipates developing a large area to high resource value. The situation bears some resemblance to the Bracut Marsh where the bank was set up to deal with losses to small pocket marshes in an industrial area. The agreement is designed to allow both public and private groups to develop banks and then sell credits to developers after sequencing of permit applications determines that off-site mitigation is appropriate. Currently, the County is working on a general policy statement with the California Department of Fish and Game (the state resource conservation agency), EPA, the Corps, FWS, the Soil Conservation Service, the Bureau of Land Management and
the Trust for Public Lands. There is no reason to believe that a formal mitigation bank agreement will not be reached in the near future. With proper project planning and a solid bank agreement, this mitigation bank offers a good opportunity to reconcile environmental and economic concerns in the County and, in so doing, achieve regional planning goals.

**Sources.**

**Washington Department of Transportation.** The State of Washington is actively looking into mitigation banking. Four to five workshops are scheduled to be held by the end of the year on the negotiation of a statewide agreement. Mitigation banking is being referred to as comprehensive advance wetland compensation.

**Sources.**

**Port of Kalama.** Some attempts have been made by the Port of Kalama, located on the Columbia River in Oregon, to develop a mitigation bank. The Port identified a site which is separated from the river by an elevated highway. The FWS was unwilling to accept this site as a potential mitigation bank due to its isolation from the river and suggested that more appropriate sites along the river be identified. There has been significant disagreement between resource agencies and the Port over the creation of a mitigation
bank, but the possibility of the use of mitigation banking at the Port still exists should an appropriate site along the river be identified.

Sources.

Humboldt Bay. There has been some consideration on the part of the Humboldt Bay Harbor District in California to develop a mitigation bank which would be used to compensate for impacts to intertidal and wetland areas immediately adjacent to the Bay. The California Department of Fish and Game and the FWS were asked to help evaluate the potential for banking in the area. California Department of Fish and Game is supposed to be evaluating and classifying the areas around the Bay prior to any further mitigation bank planning. FWS has not been apprised of any progress on the development of a bank here in over a year, but still considers this to be a potential mitigation bank.

Sources.

San Diequito River Park. Efforts are underway to develop an expansive open space preserve in the 55-square mile area of the San Diequito River Valley, California. As a funding mechanism for wetland restoration, the River Park authority, which is a separate government agency established specifically for the purposes of developing the preserve, is offering developers an opportunity to
participate in restoration of wetlands through monetary payments. There is a chance that developers could contribute funds for the restoration of an area which exceeds immediate mitigation needs, thereby creating a surplus. Several developers, including the Ports of San Diego and Long Beach have expressed an interest in participating in the wetland restoration. It is possible that some type of banking system will be developed as progress on the park continues.

Sources.


Strawberry Field, Washington. In the course of this research, there have been some references made to the restoration of a former strawberry field in the State of Washington which is being used as a mitigation bank. To date, further information is unavailable.

Region Two

No mitigation banks with FWS involvement or knowledge were reported for this Region. (Young, 1991).
Region Three

Minnesota Department of Transportation

Background. An MOA between the Minnesota Department of Transportation (MinnDOT), the Minnesota Department of Natural Resources, the Federal Highway Administration and the FWS was signed in January, 1987 establishing a state-wide mitigation bank. The State is broken down into nine highway districts and credits, which are determined using standardized wetland habitat suitability indices, are maintained at the district level. Bank activities include freshwater wetland restoration with an emphasis on prairie potholes, enhancement of existing wetlands and creation of wetlands out of upland borrow pit sites. Bank credits are used to compensate for unavoidable transportation-related wetland impacts within a district. District management teams composed of representatives from the Dept. of Natural Resources, MinnDOT, FWS and FHA are responsible for monitoring and management of bank sites.

Status. There has recently been a reaccounting of bank credits and debits. The new accounting method allows the DOT to receive credit for bank projects which either have not yet been built or have not reached their anticipated potential. The accounting method allows regions which had previously been in the red to show a credit balance, even though actual mitigation projects may not be on line or have achieved their expected benefits. Current credit balance by region is summarized in Table 2.
### TABLE 2

**MINNESOTA DEPARTMENT OF TRANSPORTATION**  
**BANK ACTIVITY BY DISTRICT**

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<tr>
<th>District</th>
<th>Credits</th>
<th>Debits</th>
<th>Balance</th>
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<tr>
<td>1. Duluth</td>
<td>13,908</td>
<td>7,744</td>
<td>6,164</td>
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<tr>
<td>2. Bemidji</td>
<td>16,047</td>
<td>10,925</td>
<td>5,122</td>
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<tr>
<td>3. Brainard</td>
<td>32,397</td>
<td>9,322</td>
<td>23,075</td>
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<tr>
<td>4. Detroit Lakes</td>
<td>3,601</td>
<td>3,907</td>
<td>306</td>
</tr>
<tr>
<td>5. Golden Valley</td>
<td>3,111</td>
<td>567</td>
<td>2,544</td>
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<tr>
<td>6. Rochester</td>
<td>534</td>
<td>1,074</td>
<td>540</td>
</tr>
<tr>
<td>7. Mankato</td>
<td>2,813</td>
<td>709</td>
<td>2,104</td>
</tr>
<tr>
<td>8. Wilmar</td>
<td>1,920</td>
<td>2,603</td>
<td>683</td>
</tr>
<tr>
<td>9. Metro Oakdale</td>
<td>3,897</td>
<td>1,790</td>
<td>2,107</td>
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In the majority of the districts, positive credit balances are due to the inclusion of mitigation projects that are planned but not yet implemented or fully operational. As such, the overall credit balance of the bank does not realistically reflect environmental improvement in the State.

Two problem areas have been associated with this bank. First, until recently only two of the nine regions were operating in the black. This has been attributed to the MinnDOT's not having designated credit areas. Now that areas have been designated, a significant amount of work needs to be done at most of these sites to bring them up to their assigned credit levels.

The second problem identified with this bank involves restoration efforts. In some cases, credits were, and are being, accrued through the development of shallow to deep marshes from wet meadowlands. The legitimacy of replacing one type of functioning wetland habitat for another has been questioned.

The bank agreement is currently under revision and efforts are underway to develop generic mitigation banking guidelines for the entire region, which would apply to any proposed bank activities rather than those exclusively designed to meet highway development needs. A matrix for mitigation ratios, which would provide standards for mitigation requirements based on distance the proposed development site is from the bank, is being developed. This approach has been criticized as punitive by some because appropriate mitigation sites may not be available within a certain proximity to the development site. A new State "No Net Loss" Law,
which is administered on a local basis, may complicate the administration and implementation of mitigation banks in Minnesota.

Sources.


Patrick Lake
Background. The Wisconsin Department of Transportation (WDOT) has acquired approximately 300 acres at Patrick Lake in East Dane County. Of the total acreage, 170 acres will be available for earning credits, a small number of acres will be designated as buffer zones and the remaining area of over 100 acres will exist as excess not eligible for credit. The area had been drained using sump pumps for use as a corn field. WDOT restoration activities have involved turning off the sump pumps and filling in well holes. The area is expected to revert back to a shallow lake/deep marsh habitat considered to be of high resource value.

The Patrick Lake Site was recommended by the Wisconsin Department of Natural Resources (WDNR) to compensate for a 20- to 25-acre loss associated with construction on Highway 151, with excess credits banked. The site is adjacent to Highway 151, so mitigation measures are considered on-site for the 20- to 25-acre loss. Credits are determined using WEM, which is an evaluation
methodology developed by the WDOT and is similar to a WET2 analysis. The bank site is currently owned by the WDOT and will be turned over to the WDNR upon completion of the mitigation project. The WDOT has made a five year commitment to monitoring and evaluation after which the WDNR will assume the responsibilities. As a passive mitigation project, maintenance and evaluation requirements are expected to be minimal.

Status. Restoration measures have been conducted and a mitigation bank plan has been developed by the WDOT and the Department of Natural Resources. FWS concurs with this plan.

Mitigation banking holds a great deal of promise in Wisconsin. There are a number of large sites being restored or under serious consideration by the WDOT for restoration. These sites create environmental values which far exceed the mitigation requirements associated with the highway projects for which they are developed. In many cases, the WDOT is required to purchase tracts which exceed mitigation needs. As an environmental fringe benefit, there are often areas within the tract that are not eligible as areas where bank credits may be established. As a result of this situation and the opportunities that exist for the restoration of large areas, the WDOT and resource agencies are anxious to develop and implement a statewide mitigation banking plan. The WDOT is depending on the adoption of some kind of banking agreement which will recognize its excess mitigation at Patrick Lake and other areas in the State.

Currently, a state mitigation task force composed of one representative each from EPA, Corps, FWS, FHA, WDOT and WDNR is
working on developing mitigation bank standards that will be flexible enough to apply to any mitigation bank proposal within the State. Unresolved issues revolve around in-kind and on-site mitigation preferences. A ratio system, based on distance from impacted area to mitigation area and types of habitat impacted and restored, has been proposed, but is seen as punitive by some due to the limited opportunities for finding acceptable mitigation sites in close proximity to areas of impact. As an indication of this problem, the WDOT is attempting to document that potential mitigation sites have been exhausted in the northern third of the State where wetland losses have been minimal and opportunities for mitigation do not exist. This issue remains to be resolved. Efforts are also underway between the St. Paul District of Corps, Region V of EPA and resource agencies to develop regional guidelines for banking to ensure compliance with 404.

Generally, the WDOT has done an excellent job in locating mitigation project sites and providing technical expertise. The WDOT has also been willing to purchase parcels at high costs. Because they are unknown at the time of bank implementation, the WDOT has been unwilling to accept responsibility for long-term operation and maintenance costs.

It is relatively certain that a mitigation banking agreement will be reached in Wisconsin soon. It remains to be seen exactly how some of the unresolved issues will be settled.

Sources.
Potential Banks

Lorain County. Developers and the regulatory community in Lorain County, Ohio are trying to address the problem that over 100 acres of development in the County are located on wetlands. It has been discovered that an area where there is a great deal of ongoing and planned development once was a wetland which was filled for agricultural purposes. Agriculture has been abandoned and everyone is trying to figure out how they are going to deal with past and future impacts on forested wetlands. No specific project has been developed as yet, but developers, the Lorain County Chamber of Commerce, the Cooperative Extension Service and the Soil Conservation Service are looking at the banking concept closely as a possible means of dealing with proposed and ongoing development in the County.

Another possible Ohio site in the development phase is "The Wilds" which is over an hour east, by automobile, of the Columbus Area. There has been some discussion about creating wetlands to diversify habitat in the area which is geographically isolated from high development areas.

Sources.

Wisconsin Cranberry Industry. There is some interest in banking as a joint project among cranberry growers. Each grower has a small
amount of mitigation to carry out, and interest in working together on a joint banking project has been expressed. Any bank attempt may not be implemented sufficiently before anticipated impacts to qualify as an actual mitigation bank. Cranberry growers will also have to deal with Wisconsin State Laws which restrict the use of compensatory mitigation.

Sources.

Region Four

Fina/LaTerre

Background. The Fina/LaTerre Mitigation Bank, located in Terrebonne Parish, South-central Louisiana, has been operating since January, 1984 when an MOA between Tenneco, FWS, NMFS, the Soil Conservation Service, the Louisiana Department of Natural Resources, and the Louisiana Department of Wildlife and Fisheries was signed. Since the implementation of this bank, Tenneco Oil Co., the original sponsor of the effort, has been bought by the Fina Oil Co. which has assumed responsibility for the bank. Total acreage of the bank is approximately 7,000 acres, of which 5,000 are owned by Fina and 2,000 are in other private ownership.

The mitigation project involved construction activities and installation of equipment designed to reduce the rate of coastal subsistence and conversion of freshwater marshes to brackish
marshes and open water. Credits, determined using HEP analyses or a mutually agreeable and credible methodology, are used to mitigate for impacts associated with oil and gas exploration. The bank is managed by an interagency team consisting of representatives from each of the parties to the MOA.

The bank term is at least 25 years and may be extended to 77 years. Recommendations of the interagency team based on required annual evaluations are implemented by Fina. A five-year comprehensive evaluation has been completed and a final evaluation will be conducted at year 25. There is an opportunity to generate more credits after 25 years.

Status. Bank activity to date is summarized in Table 3. Results of the five-year evaluation revealed a shortfall in the benefits that had been predicted for resource category two estuarine fisheries. Fina will make modifications to structures and an evaluation of the success of these efforts will be conducted in three years. No credits were lost as a result of the shortfall. The last debit was made in July, 1990, and thirteen projects have been debited to the project to date. Fina spends approximately $1 million per year on maintenance and can privately sell credits. Credit purchase price is negotiated between Fina and the buyer.

Sources.

TABLE 3

FINA/LATERRE
MITIGATION BANK ACTIVITY

<table>
<thead>
<tr>
<th>Resource Cat. 2</th>
<th>Credits</th>
<th>Debits</th>
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<td>estuarine fisheries</td>
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<th>Resource Cat. 3</th>
<th>Credits</th>
<th>Debits</th>
<th>Balance</th>
</tr>
</thead>
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<tr>
<td>wildlife habitat</td>
<td>12,056</td>
<td>0</td>
<td>12,056</td>
</tr>
</tbody>
</table>

Total                      | 158,949    | 7,729  | 151,210   |


Company Swamp

Background. An MOU between the North Carolina Department of Transportation (NCDOT), FWS, the North Carolina Wildlife Resources Commission (NCWRC) and the North Carolina Nature Conservancy was signed in September of 1985. It established a mitigation bank at Company Swamp, located at the lower Roanoke River in Bertie County, NC. The 1,436-acre site is primarily forested wetland and was considered to be threatened by development. Mitigation efforts involved preservation and enhancement of existing values.

Credits and debits are determined using a ratio-based method for losses less than five acres and HEP80 for losses greater than five acres. Credit per acre value is 45.8 credits/acre. Credits are available to compensate for unavoidable losses to palustrine forested wetlands associated with highway and bridge construction projects. The term of the bank is 30 years, and there are two
opportunities to renew the bank for the same term.

Originally, the NCWRC owned 100 percent of 700 acres and 44 percent of the remaining 736 acres. Recently, the entire 1,436-acre site has been incorporated into the Roanoke River National Wildlife Refuge, and management responsibilities have been assumed by the FWS.

**Status.** There have been severe accounting problems with this bank. It is uncertain whether a five year evaluation provided for in the bank agreement, which should have been conducted in 1990, was ever completed. Over 20 projects have used the bank for mitigation. HEP analyses were conducted for approximately five projects. The FWS is working on updating the records for this bank. A current balance of credits is unavailable at this time.

**Sources.**


**Hillsborough County**

**Background.** A provisional MOU between the Florida Department of Environmental Regulation and Hillsborough County addresses the concept of mitigation banking and outlines procedures for establishing bank sites in Hillsborough County, Florida. Actual mitigation banks will be established through permits issued for mitigation activities at individual bank sites.
Two potential bank sites, one in the southeast and one in the northwest, and each of approximately 40 acres, have been identified. The sites are currently owned by the County. The southeast site contains both salt and freshwater wetlands and the northwest site is primarily forested and herbaceous wetlands. Specific restoration activities as well as monitoring and evaluation requirements will be contained in permit conditions. A sliding scale of credits based on the age of the bank and success of vegetation efforts will be used. Exact evaluation procedures and success criteria will be contained in permits. Credits based on saltwater wetland restoration will become available upon completion of mitigation activities and credits based on freshwater wetland restoration will be available five years after completion of the mitigation activities, provided efforts are successful. Credits will be available to mitigate for unavoidable losses associated with highway and utility capital improvement projects within Hillsborough County.

Status. A permit for the first mitigation site, located in the southeast of the County has been drafted and is expected to be issued shortly. A permit for the second site is expected to be issued by Fall of 1992.

Sources.

Louisiana Department of Transportation and Development Background. The Louisiana Department of Transportation and Development (LDOTD) Mitigation Bank, implemented without benefit
of a formal agreement in 1982, consists of one large and 20 small scattered tracts of bottomland hardwoods scattered throughout Grant and LaSalle Parishes in Central Louisiana and totals 2,944 acres. Three scenarios were proposed for the mitigation project. The first of these was preservation only, the second was implementation of a timber management plan, and the third included both timber management and fencing. Fencing has since been determined to be impractical and only preservation of bank lands has occurred. Credits have been used to mitigate for unavoidable losses associated with highway projects.

Status. The status of this bank remains unresolved. Because the parcels are small and isolated, there have been severe management problems with this bank. Seventeen projects have been applied against the bank and, in spite of an 80-credit balance on paper, the LDOTD has been prohibited from further use of the bank. The LDOTD has not conducted required surveys of the lands and as a result, the FWS considers the bank to be overdrawn and unsuccessful. FWS has reluctantly assumed management and surveying tasks. There have also been problems related to out-of-kind replacement with this bank. Bank areas which are bottomland and hardwood areas have been used to compensate for other types of wetland losses. There is a slight chance this bank could be reactivated should the LDOTD decide to undertake active enhancement measures such as implementing a timber management plan.

It appears that the problems encountered in this bank effort stem from the use of entirely inappropriate sites for banking. The
use of a number of unrelated, separate sites made management and restoration impractical, thereby defeating one of the main goals in mitigation banking, consolidating mitigation costs and needs into a single site. Considering the opportunities for using mitigation banks to compensate for highway impacts, this bank has been a failure. This was a poorly planned mitigation project, bank or no bank, and should be used as a lesson for future banking attempts.

Another source of problems for this bank has been the lack of any formal written agreement between the LDOTD and resource agencies. Perhaps, the impracticability of the mitigation bank would have become apparent during the negotiation of a formal bank agreement.

Sources.


Mississippi State Highway Department
Background. The Mississippi State Highway Department (MSHD) mitigation bank was established in 1988 through the issuance of a general permit by the Corps. A provision contained therein, which allowed for the creation of mitigation banks, was seen as a vehicle for relief in dealing the consistent small losses associated with a massive, 12-year highway program. There are currently three sites in the bank. The first is a 360-acre site in Green County, Southeast Mississippi and contains pitch pines and high-value savannah pines.
Restoration activities at the Green County Site include controlled burning and selective clearing. The second is a 162-acre site in Bolivar County, adjacent to the Dahomey National Wildlife Refuge, and consists of bottomland hardwoods. The third is a 318-acre site, also consisting of bottomland hardwoods, in Grenada County, and is adjacent to the Malmaison Management Area.

Bank lands are purchased by the MSHD and turned over to resource agencies upon completion of mitigation restoration activities. Mississippi State Law requires that a resource agency take on management of bank areas and, as a result, management must be negotiated for each bank site. The Green County Site is managed under the National Wildlife Refuge System and the Bolivar County Site is managed by the Mississippi Department of Wildlife, Fisheries and Parks (MDWF&P). The Grenada County Site will also be managed by the MDWF&P.

Credits and debits are determined using best professional judgment based on value, i.e., types of habitat lost, species diversity, etc. A minimum compensation ratio of one acre restored for one acre impacted is required. The bank is designed to compensate for small losses associated with highway development projects. Monitoring and evaluation are left to the managing resource agencies.

**Status.** The general permit which established this bank in 1988 expires in 1994, and there is a possibility of negotiating a formal mitigation bank agreement at that time.

The MSHD is currently finalizing plans to purchase the 318-acre
site adjacent to Malmaison Management Area. The deal is expected to be closed by the end of March, 1992.

Current balance: Green County Site; 252-acre balance
Bolivar County site; 147-acre balance
Grenada County site; credits have not yet been established.

Sources.

Wheeler National Wildlife Refuge

Background. The Alabama Highway Department (AHD) is currently negotiating the acquisition of 73 acres of an 80-acre parcel previously converted for agricultural uses. The site is adjacent to the Wheeler National Wildlife Refuge (WNWR) in Morgan County, Northern Alabama. The AHD will restore the site, which was last used as a duck hunting club, to forested wetlands. Under the management of the WNWR, the area will be planted with acorns and the hydrology adjusted. The bank will be managed by FWS as part of the National Wildlife Refuge System.

The bank will be used to compensate for highway project impacts in the Tennessee Valley at sites less than two acres. A ratio-based system will be used to determine credits and debits, since quantitatively-based methodologies are inappropriate for small losses of this type. A minimum of 2:1 replacement ratio of restored area to impacted area is required in the draft agreement, and it is understood that a higher ratio may be required.
**Status.** Acquisition of 16 acres of the Site was planned to mitigate for an 8-acre loss associated with a bridge construction project, when the opportunity arose to acquire the entire remaining 73 acres of the Site. Both the Alabama Highway Department and the WNWR were interested in taking advantage of this opportunity to add to the Refuge while providing mitigation for future highway construction impacts through the development of a mitigation bank. A brief, simple Memorandum of Agreement between the Alabama Highway Department, Federal Highway Administration, the FWS, EPA, the Alabama Department of Conservation and Natural Resources and the Nashville District Corps office has been developed and should be finalized by the end of 1992. It is understood that a 16-acre debit will be made to compensate for 8 acres that will be lost due to bridge construction impacts.

**Sources.**

Memorandum of Agreement for a Wetland Bank between State of Alabama Highway Department, Federal Highway Administration, USFWS, EPA, Alabama Department of Conservation and Natural Resources and the Army Corps of Engineers, Nashville District, (no date).

**Pridgen Flats**

**Background.** A mitigation bank, sponsored by the North Carolina Department of Transportation (NCDOT), is currently being implemented in Sampson County, Southeast North Carolina. The approximately 200-acre site is a former pocosin wetland which had
been drained and cleared for agricultural uses. The Site was seized by the federal government after a farm loan default in the mid-1980s, and the FWS currently has an easement on 300 acres to conserve and restore the area.

The NCDOT is actively managing the restoration project at Pridgen Flats. Upon successful completion of restoration measures, the Site will fall under the management of the National Wildlife Refuge System. The bank will be used strictly to compensate for losses to pocosin habitat associated with highway projects within the State. Debits and credits require the consensus of an interagency team composed of representatives of the FWS, NCDOT and the North Carolina Wildlife Resources Commission (NCWRC). A minimum of two restored acres for every one impacted acre of pocosin wetlands is required.

Restoration efforts are somewhat experimental as re-creation of this type of habitat is considered difficult. In some areas, restoration attempts involve controlled burning followed by revegetation. A natural succession area has been developed where controlled burning activities only will take place. If, after five years, it is found that the area has not been colonized as anticipated, the NCDOT will be responsible for plantings.

The NCDOT has made a commitment to maintain water level and control structures for twenty years. The FWS will provide data sheets for proposed transactions to all parties of the MOU and supply annual summaries of bank activity until all credits have been depleted. The draft MOU requires an extensive evaluation of the bank
after five years.

Status. The official bank agreement is currently at agencies awaiting signature. However, the bank is, in effect, operational. The NCDOT is currently carrying out restoration measures and several highway projects have already been earmarked for debiting from the bank. As credits are officially established, it is likely that they will immediately be used.

Sources.

Draft Memorandum of Understanding between NCDOT, NCWRC, and the USFWS (no date).

Pine Flatwoods

Background. A MOA between the Corps, the EPA, the FWS, the Louisiana Department of Natural Resources, the Louisiana Department of Wildlife and Fisheries and the Nature Conservancy of Louisiana has been developed to establish a mitigation bank which will be used strictly to compensate for losses to pine flatwood habitats in an area southeast of parishes east of the Mississippi River and north of Lake Pontchartrain. A system of priority site acquisition, which entails the inventory and evaluation of existing pine flatwood wetlands, is to be used in determining bank sites. The Louisiana National Heritage Program has identified three possible sites and is in the process of negotiating the purchase of one of these.

Pine flatwoods will be managed to maintain and enhance existing
functions and values. Mitigation projects will involve controlled burning which is necessary to maintain biological diversity, control of ground water hydrology and restriction of unnatural disturbances. Credits and debits will be determined using an "Ecological Value Assessment" which has been developed specifically for this bank. The community model is similar to a HEP analysis and measures botanical diversity as well as other variables including ditching and surrounding development. Calculations are based on a fifty-year term for each site and a minimum of one-to-one functional replacement including an adequate margin of safety is required. Evaluations by an interagency team will be conducted every five years, and interagency team meetings will be held every two years to assess whether modifications to the bank sites are necessary.

Bank credits will be used strictly to mitigate for losses to pine flatwoods, particularly savannah pine habitat. Projects eligible for bank use are associated with development in a rapidly growing area which serves as bedroom communities for New Orleans. Examples of types of projects for which credits may be used include residential development, road construction and airport expansion.

Status. This bank has been designed to address, on a regional level, the problems of development pressures on pine flatwood wetlands, which are considered to be of high resource value. The MOA is currently at each agency being reviewed and is likely to be implemented in the near future. Developers will be allowed buy credits from the Nature Conservancy through direct payments. Costs per acre will be based on acquisition, management and
administrative costs calculated for a fifty-year period. The agreement is relatively broad to allow bank use for a variety of development activities, payments by developers to help finance the acquisition of sites, and the transfer of appropriate sites by private entities to the Nature Conservancy. Barring any unforeseen problems, the agreement is likely to be adopted in the near future.

Sources.

Memorandum of Agreement between the U.S. Army Corps of engineers, the EPA, USFWS, Louisiana Department of Natural Resources, Louisiana Department of Wildlife and Fisheries and the Nature Conservancy of Louisiana, (no date).

WET, Inc.
Background. A private sponsor, the Wetlands Environmental Team, Inc. is proposing the implementation of a private mitigation bank, at Milhaven Plantation, which is 75 miles northwest of Savannah, Georgia. The Site is degraded wetland which has been subject to draining, ditching and clearing and will be restored to forested wetlands. Restoration efforts are expected to produce 50 acres of wetlands in an 85-acre "core area" and 250 acres of wetlands in a 500-acre adjacent area.

Mitigation ratios will be established by resource agencies and applied by the Corps on a case-by-case basis. Under the terms of a draft MOA between the Corps, FWS, EPA, Soil Conservation Service, Georgia Department of Natural Resources and WET, Inc., credits will become available for sale when an interagency team determines that
success, measured using specific vegetation criteria, has been achieved. A five-year escrow account will be established by WET, Inc. to guarantee monitoring and maintenance costs. Conditions of the escrow account must be approved by the regulatory agencies.

**Status.** The draft MOA still has some significant details to be worked out. The issue of timber harvesting in the area after 50 years has been brought up by WET, Inc., and is unacceptable to the FWS. There is also concern with regard to pesticide use on neighboring properties and specific monitoring and maintenance criteria which are not contained in the MOA.

There has been pressure on resource agencies to expedite review of the mitigation plan so that plantings can take place this growing season. In spite of unresolved problems with the proposed bank, the Corps is expected to issue a permit to WET, Inc. to begin restoration at the Milhaven Plantation Site soon. The bank agreement still has a way to go before it will acceptable to all parties. Nonetheless, it looks as though WET, Inc. may gamble that an agreement will be reached by starting restoration activities as soon as a Corps permit is issued.

Progress in the development of a private mitigation bank at Milhaven Plantation should be closely followed. Aside from raising philosophical issues, the idea of a private mitigation bank carries with it a host of practical concerns. The Regional FWS Office has considerable experience in mitigation banking and is working to ensure that potential problems are cautiously anticipated and addressed.
Sources.


Draft Memorandum of Agreement for the Establishment and Approved Usage of a Compensatory Mitigation Bank between the Wetlands Environmental Team (WET), Inc. and The US Army Corps of Engineers, USFWS, EPA Soil Conservation Service and the Georgia Department of Natural Resources, (no date).

Marshlands Plantation

Background. A second private mitigation bank has been proposed, in Georgia, at Marshlands Plantation, in Camden County, adjacent to the Satilla River. The Site totals 832 acres, 253 of which are in active cultivation and designated for restoration. Hydrology will be restored and seedings will take place to return the Site to a functioning forested wetland. Approximately 20 acres will be used as a five-year experiment in restoration. If, after five years, the Site is deemed successful, the remaining area will be restored. Credits for low functioning values will be established after two years and higher credits for higher functioning values will be assigned after five years of success. Credit will be available for sale to mitigate for impacts associated with urban and general development activities in the Satilla River Basin, which includes Camden and Glen Counties as well as the eastern portions of Wayne,
Brantley, Pierce and Charleton Counties.

**Status.** There has been less controversy surrounding this bank than the WET, Inc. bank because the proposal includes plans for a five-year experiment on the Site to ensure future success on the entire area. The deadline for responding to the permit application for restoration activities had passed as of March, 1992.

**Sources.**

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**Region Five**

**Goose Creek**

**Background.** A mitigation bank was developed between 1982 and 1984 by the Virginia Department of Transportation (VDOT), at Goose Creek, in Chesapeake, Virginia, by virtue of a Corps permit. The mitigation involved restoration of a tidal salt marsh through excavation and planting at the 10.5-acre site owned by VDOT. The bank is designed to compensate for impacts associated with highway projects. It has been used to compensate for impacts on forested wetlands, but now is used for tidal emergent areas only. The Corps currently requires 2:1 replacement for tidal emergent wetland losses. There is no formal monitoring and evaluation program for this bank.

**Status.** To date, 15 highway projects have used bank credits with the last withdrawal made in 1989. Current bank balance is 373,749...
sq. ft. (8.54 acres).

The Virginia DOT is presently working with the Corps on developing a "wetland compensation agreement" which would recognize DOT mitigation activities at three other sites in the State where mitigation in excess of permit requirements was carried out. The DOT considers these areas to be banks but they cannot be considered as such by the FWS until an MOA has been signed. Any agreement would also lay the groundwork for future mitigation banks in Virginia.

Sources.


Otter Dam Swamp
Background. The Virginia Department of Transportation (VDOT) created a freshwater wetland habitat at Otter Dam Swamp, located on the Nottoway River in Greenville County, Virginia, in 1990. The site is 12 acres and consists of nontidal, palustrine wetlands. Mitigation ratios, based on difficulty level and length of time to establish, are used for in-kind replacement of habitat losses. The ratio for lost acres to bank acres are 1:1 for emergent nontidal
wetlands, 1.5:1 for scrub shrub, and 2:1 for forested wetlands. The VDOT owns the bank site and can sell or give it to a resource agency or group for long-term preservation when bank credits have all been used. Monitoring of the bank site is currently guided by normal permit requirements.

**Status.** The VDOT has not received full credit for mitigation activities, but has been allowed to make withdrawals from the bank. Of a total of twelve acres, seven have been used. A statewide agreement developed between the Corps, State Water Quality Control Board, Virginia Marine Resources Commission and VDOT, with input from EPA, FWS and NMFS, is expected to be finalized within the next couple of years. After agreement is reached, VDOT will be allowed to use remaining five acres. Although a formal agreement has yet to be implemented, Otter Dam Swamp has functioned as an active bank.

**Sources.**


**Maryland State Highway Administration**

**Background.** An agreement is currently being negotiated for the development of a statewide mitigation bank, sponsored by the Maryland State Highway Administration (MSHA), to be used primarily to compensate for highway project-related impacts. A draft
agreement does not limited bank use to these types of losses and is designed to include other potential situations where the bank could provide appropriate mitigation. The agreement breaks the State down into watershed areas in which bank transactions would be limited. Restoration of nontidal wetlands is planned for a site(s) which is yet to be determined.

Under the draft agreement, debits would be made based on a impacted area to bank area ratio determined according to habitat type. The replacement ratio for nontidal emergent wetlands is 1:1, and for forested wetlands, the ratio is 1.5:1. Ratios for mitigation projects that do not use the bank are 1.5:1 for nontidal emergent wetlands and 2:1 for forested wetlands. Standard monitoring conditions and criteria are contained in the draft agreement. Specific monitoring programs and evaluation criteria will be included in permits.

**Status.** Major barriers to the signing of this agreement revolve around the question of the term of the bank and the bank site selection procedure. MSHA wants a simple majority and FWS wants unanimous agreement among the eight agencies involved for each bank site. MSHA is trying to avoid being directed to more expensive sites. The bank agreement is completed, but these two issues remain unresolved. Although resource agencies are putting considerable pressure on MSHA to sign, the MSHA and FWS have not yet reached agreement on two remaining issues. Some type of agreement is likely to be eventually implemented.

**Sources.**
New Jersey Department of Transportation

Background. The New Jersey Department of Transportation (NJDOT) is currently working to develop a statewide mitigation bank program. The plan envisions the development of both saltwater and freshwater wetland banks. Some sites have been looked at, and a small site of approximately eight acres has been identified as a potential site. The NJDOT would purchase and develop sites and, following completion of restoration, would turn the sites over to an appropriate resource agency, such as the New Jersey Department of Environmental Planning, for preservation and management. The NJDOT would be responsible for an initial monitoring period and then turn over responsibilities to the resource agency. A wetland mitigation council, established through a State Freshwater Wetlands Law, would ultimately oversee bank activities.

Status. An MOU has been negotiated and is currently being reviewed by resource agencies. There is somewhat of a wait-and-see attitude in anticipation of the issuance of federal guidelines on mitigation banking.

The biggest problem in developing the bank agreement has been negotiating when the bank can be used. Regulatory agencies want a complete alternatives analysis and mitigation site search before credits can be used. Agencies want alternative possible mitigation sites in closer proximity to the impacted area to be explored (a concentric circles analysis) before credits can be used. The NJDOT
has taken the position that credits should be allowed to be used once opportunities for mitigation in adjacent sites have been exhausted.

**Sources.**

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**Region Six**

**North Dakota State Highway Department**

**Background.** A statewide mitigation bank was established by the North Dakota State Highway Department (NDSHD), through a 1975 MOU between the FWS and the NDSHD to be used to compensate for highway project impacts. The size of the bank is unlimited and credits can be established throughout the State as opportunities arise. Mitigation activities eligible for credit include the enhancement, restoration and creation of wetlands. Debits and credits are determined using consensus professional judgment. Title to bank lands is turned over to the FWS for inclusion in the National Wildlife Refuge System upon completion of restoration activities. No specific evaluation procedures are required by the MOU, but some contract research has been conducted.

**Status.** Through 1991, 16 projects had used bank credits. A total of 174.65 credits have been accrued and 118.35 debits subtracted leaving a credit balance of 56.3. The bank only pertains to FWS easement wetlands.

**Sources.**
Kriel, Karen. USFWS, Bismarck, ND. Pers. comm. (27 February and 3


South Dakota Department of Transportation

Background. An MOA between the South Dakota Department of Game, Fish and Parks, FWS, FHA, and the South Dakota Department of Transportation (SDDOT) to establish a statewide mitigation banking program was signed in October of 1988. To date, there is one 25-acre site in the bank. Restoration activities at the Site involved plugging drains that had formerly been utilized to convert wetlands for agricultural purposes. The farmer could not participate in a federal farm program if the wetland continued to be drained and, as a result, the SDDOT found itself with a willing seller and a relatively easy restoration project. By plugging the site, the area is expected to revert back to its natural wetland state. This is considered a passive mitigation project and, as such, in-depth monitoring and evaluation has not been required. Specific bank monitoring and evaluation procedures are not contained in the MOA. Title to bank lands will be turned over from the SDDOT to the FWS upon completion of restoration.

Status. No debits have been made to this bank. The MOA is loosely enough written to allow for the establishment of other bank sites within the State.

Sources.
Memorandum of Understanding Among Federal Highway Administration, South Dakota Department of Transportation, South Dakota Department of Game, Fish and Parks and FWS, (no date).

Wyoming Department of Transportation

Background. A MOA establishing a statewide mitigation banking program, sponsored by the Wyoming Department of Transportation (WDOT), to compensate for losses associated with highway development projects, has been negotiated. Specific bank sites have not been determined, but a potential site east of Grand Teton National Park has been identified. The potential site is an abandoned stream channel which has been filled over time, probably as a result of beavers. The Wyoming Department of Game and Fisheries has been designated as the bank manager and bank activities must meet the approval of resource agencies. In general, riparian, riverine and open water wetland habitats in the east of the State have been targeted for inclusion into the bank.

The State has devised its own model, named "Super Bog" which is based on functions to determine bank credits and debits. The model looks at such variables as shape, size, contours, and vegetation. The State found HEP procedures inappropriate for dealing with the number of abandoned mine lands which are jurisdictional wetlands. The model also looks at wildlife habitat, water quality and recharge parameters, in that order. Since there are few data on water quality
and recharge parameters, wildlife habitat is looked at most closely in determining credits and debits. The term of the bank is 50 years, and is based on the life expectancy of the development project impacts. Management requirements will be based on the fifty-year term.

**Status.** The MOA is expected to be adopted by 1993. There is some feeling that movement toward the implementation of the agreement has been stalled due to Section 404 reauthorization and the anticipation of federal guidelines on mitigation banking. The agreement is currently awaiting approval by upper level bureaucrats within agencies. The EPA and the Corps are parties to the agreement and there is some pressure for them to sign. It remains uncertain whether they will. The agreement is expected to be implemented even without the participation of the EPA and the Corps.

The issue of bank land ownership has been difficult to resolve. Bank lands are viewed as an additional management load and cost and, consequently, nobody wants them. Current policy is to maintain ownership with whomever owns the land at the time bank is established. Private land owners would have to agree to maintain project purposes. Generally, questions of ownership will be evaluated on an individual basis.

There has been some pressure from the Wyoming Governor's office to allow credits to be sold. Resource agencies have opposed this and the issue remains unresolved.

**Sources.**
Montana Department of Transportation

Background. A MOU between the Corps, EPA, FHA, the State Highway Commission, the Montana Department of Fisheries, Wildlife and Parks, the State Water Quality Department, the State Health Department, and the Montana Department of Transportation (MDOT) was signed in March of 1989 to establish a statewide mitigation banking program. The bank breaks the State into regions, drainages, and subdrainages and is used to compensate for impacts associated with highway development projects in those areas.

Two sites have been restored under the bank agreement to date. The first is a 25-acre site adjacent to Brown's Lake and the Blackfoot Waterfowl Production Area in the northwest part of the State. The second site is approximately 60 acres of the Lee Metcalf Otter Pond, located in the Bitteroot Valley. The FWS owns and manages both sites. In the case of the Blackfoot WPA, a drained wetland in excess of 100 acres was restored under the supervision of Ducks Unlimited. The area is adjacent to a highway and Nature Conservancy Lands. The MDOT provided some of the funds for restoration and received a pro-rated credit of 25 acres. The Site has been used to mitigate for a number of ongoing projects along the adjacent highway. In case of the Lee Metcalf Otter Pond, 60-65 acres of credit were earned to mitigate for highway projects in Bitteroot Valley. With MDOT funding, Ducks Unlimited constructed the site.

Status. Parties to the agreement are currently working on renewing the MOU which has a two-year termination date. Some regions are
ahead. A total of 189 acres of projected impacts, some of which have already occurred, have been identified throughout the State. The State plans 67 acres of on-site mitigation of which eight acres have been implemented. Off-site, 85 acres of wetlands have been constructed through the bank. The Northwest Region of the State has positive credit balance as a result of the Blackfoot WPA Project, which created 137 acres of restored area to compensate for 131 acres of projected impacts. The Lee Metcalf Otter Pond Site has a small credit balance.

The MOU establishes a framework for cooperation among agencies. A technical subcommittee composed of wetlands specialists from involved agencies meets three times a year to review state wetlands inventory and guide decisions. A ledger, which is broken down by region, is maintained by the Highway Dept., with a running account of wetland losses and gains, both to date and projected. The technical subcommittee adheres to the sequencing guidelines of Section 404 in a step-wise review process. A general acre-for-acre rule may be qualified by the technical subcommittee upon review of project specifics such as type of habitat loss.

This is a good example of a statewide effort to develop cooperation among agencies in administering the 404 program and to address the more general goal of no net loss of wetlands. The mitigation banking program is incorporated into an overall mitigation policy by the Highway Dept. The program seems to be working quite well although there have been some setbacks (one wetland restoration project failed). It seems that the
implementation of banks in Montana has resulted in environmental gains for the State. Potential sites for banks continue to be reviewed and, as opportunities arise, it is likely that several other bank sites will be developed.

**Sources.**


**Bonneville**

**Background.** A 9,500-acre site, located on a site known as the Emory Smith Lands, was implemented as a mitigation bank in 1983. There was no formal agreement to establish the bank. Restoration activities involved removing sheep from the site to improve deer habitat. Funding for site acquisition was provided by the Bureau of Reclamation and title has been turned over to the Utah Division of Wildlife Resources. The bank was used to compensate for losses associated with the Central Utah Project, which was a major water development project.

**Status.** Bank is defunct; all credits used. Wildlife management goals included in bank plan have been met. The Utah Division of Wildlife Resources continues to actively manage this area and plans to add watering areas and fencing to improve habitat value.

**Sources.**
Potential Banks

Flathead Indian Reservation. The Flathead Indian Reservation, located in Northwest Montana is currently reviewing the idea of a major wetland restoration project within the reservation boundaries. Designs for a five-year restoration project have been developed. It is likely that the tribe will soon assume control of the Section 404 program for the reservation and, once this has occurred, definitive plans to establish a large bank site on the reservation may be forthcoming. The tribe has a good reputation with resource agencies on environmental issues. Progress toward the restoration of wetlands and the assumption of Section 404 responsibilities by the tribe should be monitored, as a host of wetlands jurisdictional issues may be raised as a result of the reservation system.

Sources.

Price River Valley. Numerous agencies have been involved in the development of a mitigation bank in the Price River Valley, Utah. The effort has been sponsored by the Utah Department of Transportation, the Utah Division of Wildlife Resources and the City of Price. Discussions on developing a bank began several years ago, but were held up by funding problems. Lands for bank use have been acquired in the City of Price. It is unclear whether federal funding, possibly through the Surface Transportation Act of 1990, has rekindled interest in this project.
Sources.

Region Seven

As of August, 1991, no mitigation banks have been implemented in Alaska (Meehan, 1991).
CHAPTER SIX
RESULTS AND DISCUSSION OF INVENTORY

Introduction

There has been an obvious surge in the number of planned and implemented mitigation banks. In 1985, Soileau, et al. identified nine active and two planned mitigation banks. In 1988, Short identified nine active, two planned, two defunct, and eleven potential banks. The defunct banks were designed to be finite and have ceased to exist. Today, there are at least 11 active, 12 planned, 5 defunct or nearly defunct, and 10 potential banks (See Appendix A). Considering the recent increased interest in mitigation banking, any inventory of proposed and implemented banks is limited. The situation is changing almost daily and the harder one looks, the more one finds. Every attempt has been made to include mitigation banks for which there is information available. There may be proposed or implemented banks that are not well known to regional resource agencies contacted, and as a result, have been excluded from the inventory. Any omissions are unintentional, if not unavoidable, and, hopefully, will not significantly change general conclusions.
Regardless of potential errors of omission, the hypothesis that the number of mitigation banks continued to grow between 1988 and the present can be accepted.

**Ports**

Clearly, the use of mitigation banks by ports has not been as expected. Mitigation opportunities for expanding West Coast ports are limited by costs, availability of sites, and the regulatory framework. In 1988, Short identified five port-sponsored mitigation banks. Of these, two are now defunct, one continues to operate at a low credit level with no credits added to it since its implementation, one remains in the planning phase and one did not perform as expected (See Table 4). No new port-sponsored mitigation banks have been implemented, although there have been some attempts. An explanation for ports not using mitigation banking as was anticipated cannot be found in any single variable, but rather, seems to lie in the cumulation of a number of factors.

Generally, maintenance and project dredging do not require mitigation. Dredge spoils from these types of projects are frequently deposited at designated ocean disposal sites. Ports must still receive Section 404 permits for these activities, but permits are rarely conditioned with compensatory mitigation requirements. With no fill activity going on, per se, and no irreversible impacts resulting from the dredging, the Corps will not require a mitigation project. Under Section 404 guidelines, open water is simply
### TABLE 4

**PORT-SPONSORED MITIGATION BANKS**

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaheim Bay/Port of Long Beach</td>
<td>defunct</td>
</tr>
<tr>
<td>Newport Bay/Port of Long Beach</td>
<td>defunct</td>
</tr>
<tr>
<td>Cabrillo Marina/Port of Los Angeles</td>
<td>active</td>
</tr>
<tr>
<td>Batiquitos Lagoon/Port of Los Angeles</td>
<td>planned</td>
</tr>
<tr>
<td>Astoria Airport Mitigation Bank/Port of Astoria</td>
<td>has not achieved restoration goals</td>
</tr>
</tbody>
</table>

*Source:* Author's analysis.
becoming deeper open water. Therefore, ports have little use for mitigation banks designed to compensate for maintenance and project dredging.

Port use of mitigation banking has been limited to West Coast ports, which are in an expansion mode as a result of increases in Pacific trade. In planning expansion projects, the intensity of uses in the coastal zone creates several barriers to the implementation of mitigation banks by ports. Land costs tend to be very high for appropriate mitigation sites, and the identification of such sites is extremely difficult. When costs of acquisition and restoration are balanced against expected benefits, mitigation plans often become prohibitively expensive. The Port of Long Beach estimates that today it would cost the Port approximately $250,000/acre to purchase and restore an appropriate mitigation site. The Port of Los Angeles is expecting to pay almost $50 million in total for the establishment and maintenance of a 600-acre bank site, at Batiquitos Lagoon. Furthermore, the lagoon is almost 90 miles away from the Port. Finding appropriate sites for port mitigation can be likened to buying an expensive house that is a long commute to work; if it is the only place available, then you will buy it or have no place to live. Faced with high property and restoration costs and a lack of available sites, the realistic opportunities for ports to appropriately mitigate for expansion activities, using mitigation banking or not, are extremely limited. The result is a constraint on development that has forced ports to intensify land use, increase efficiency, and "keep their fingers crossed" on expansion plans,
hoping that some means to deal with mitigation requirements will be found.

The case of Batiquitos Lagoon raises several issues, in addition to cost and the lack of appropriate sites, that serve as an example of why mitigation banking has not caught on with ports. Of the 600-acre site, the Port of Los Angeles will receive credits for 396 acres. Although wetland restoration projects usually involve a combination of different habitats, ports may only receive credit for the restoration of subtidal and intertidal habitats. Credits generated by other components in wetland restoration, such as enhancement of waterfowl habitat or biodiversity, cannot be used to compensate for open fill expansion projects. Hence, there is little incentive for ports to develop habitats for which they will receive no credit. This problem was experienced by the Port of Kalama where the FWS determined a proposed bank site to be inappropriate. Any restoration of the site, in terms of mitigating for port impacts, would be worthless to the port, even if habitat values were increased at the site. In the case of the Port of Astoria, the mitigation bank has not performed as planned and has become an essentially freshwater habitat. There are significant issues that need to be resolved with regard to the value of this bank to mitigate for port-related impacts before the bank can be used.

The Batiquitos Lagoon project, and ports in general, have been subject to a layer of regulation that noncoastal mitigation banks have not had to address. Ports must negotiate development and mitigation plans with a myriad of local, state, regional and federal
agencies, as well as private interest groups, many of which have conflicting goals. Compromises that satisfy the multitude of interests may cause the port to sacrifice too many of its own interests making development and mitigation projects unfeasible.

Public resistance to port mitigation banks, which surfaces in the public review process and in coastal management decisions is once again epitomized in the Batiquitos Lagoon project. After substantial agreement was reached, the project is now tied up in the courts. Even after years of negotiation, a private conservation group has delayed development plans through litigation that "arises from environmental laws that instruct regulatory officials not to compromise on unresolved environmental questions and that give advocacy organizations strong incentives to sue" (Kagan, 1991, p. 327). Consider that a MOA for the Batiquitos Lagoon project was signed over five years ago, construction is not expected to get underway until the Fall of 1993, and that the Sierra Club is currently suing the Port over the mitigation plans. One has to wonder if the effort of putting a bank together is justified.

Negotiating a mitigation bank agreement can be extremely time consuming and, at times, futile. Nonetheless, West Coast ports continue to develop expansion plans as Pacific Rim trade increases. Many of the barriers associated with the successful implementation of mitigation banks by ports will have to be faced eventually as permits for expansion projects are sought. In the process of elimination of possibilities for mitigation, ports seem to be remaining open to the idea of mitigation banking. The Newport Bay,
Anaheim Bay and Cabrillo Marina Mitigation Banks can be considered successful in the sense that they achieved anticipated goals for the ports. The Port of Astoria mitigation bank which has not achieved anticipated goals, cannot be considered a success and the problems associated with the bank at Batiquitos Lagoon have been discussed. The availability of financially and environmentally feasible sites for restoration has severely limited the use of mitigation banking by ports. Based on personal interviews, past performance and the current inventory of mitigation banks, the hypothesis that ports have had the greatest degree of success with mitigation banking must be rejected.

In spite of the results of this inventory, the potential for ports to benefit from mitigation banking remains. While it has been difficult for large, urban ports to find suitable mitigation sites, smaller ports may have opportunities to assist in achieving regional restoration goals, and in so doing, incorporate future port development mitigation needs. There may also be an opportunity for ports to satisfy the public access requirements of the Coastal Zone Management Act by incorporating provisions for public access, for activities such as bird watching, in mitigation bank plans.

**Departments of Transportation**

One striking result of the inventory is the increased use of mitigation banks by state departments of transportation (DOTs) and similar highway authorities. The number of active DOT mitigation
banks has doubled from five to ten since 1988 (See Table 5). There are an additional seven DOT-sponsored banks which have reached a high level of planning.

Of the ten implemented banks, six are operating with a credit balance and have been relatively successful. The Louisiana DOT, the Minnesota DOT and the North Carolina DOT/Company Swamp mitigation banks have had severe problems, and cannot be considered successful at this time. The remaining bank, Otter Dam Swamp, sponsored by the Virginia DOT, has not been officially recognized in a MOA, but has been used for debits nonetheless.

MOAs or MOUs have been developed for seven more DOT-sponsored banks (See Table 6). It is likely that most, if not all of these agreements, will be implemented within the next couple of years.

Mitigation banking has become particularly attractive to transportation authorities. As a result of the linear nature of highway projects, DOTs are continuously involved in 404 permit process and frequently need to mitigate for small losses. One of the main benefits of mitigation banking suggested is that it allows developers to consolidate small mitigation needs into a single, large site. In many of the reviewed cases, large sites adjacent to highway development areas became available and were good candidates for restoration. This allowed for both on-site mitigation for project specific impacts and banking of credits for future off-site mitigation. In other cases, areas were targeted for restoration by resource agencies and purchased by DOTs. Most of the agreements divide states into regions within which credits can be exchanged, so
### Table 5

**Implemented Department of Transportation-sponsored Mitigation Banks**

<table>
<thead>
<tr>
<th>Year</th>
<th>States/Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>As of 1985</td>
<td>Louisiana DOT, Goose Creek/Virginia DOT, Minnesota DOT</td>
</tr>
<tr>
<td>As of 1988</td>
<td>North Dakota DOT, Company Swamp/No. Carolina DOT</td>
</tr>
<tr>
<td>As of 1992</td>
<td>Mississippi State Highway Dept., Montana DOT, South Dakota DOT, Idaho DOT, Otter Dam/Virginia DOT</td>
</tr>
</tbody>
</table>

**Source:** Author's analysis.
<table>
<thead>
<tr>
<th>Proposed Department of Transportation-Sponsored Mitigation Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrans</td>
</tr>
<tr>
<td>Patrick Lake, Wisconsin DOT</td>
</tr>
<tr>
<td>Wheeler National Wildlife Refuge/Alabama DOT</td>
</tr>
<tr>
<td>Pridgen Flats/North Carolina DOT</td>
</tr>
<tr>
<td>Maryland State Highway Administration</td>
</tr>
<tr>
<td>New Jersey DOT</td>
</tr>
<tr>
<td>Wyoming DOT</td>
</tr>
</tbody>
</table>

Source: Author's analysis.
that possible off-site mitigation through the use of banks is geographically restricted.

There was considerable discussion with regard to the requirement for alternative analyses of mitigation sites prior to the use of bank credits. In particular were concerns surrounding the extent to which DOTs will have to search for other, possibly more appropriate mitigation sites, before banks can be used. This has been a significant problem in the development of an MOU by the New Jersey DOT. The Wyoming DOT has taken a progressive approach to this problem by actively seeking out and documenting potential mitigation sites and areas where there are no feasible opportunities for mitigation.

Another possible factor contributing to the growth in DOT-sponsored mitigation banks may be the opportunity for federal funding assistance provided in the Surface Transportation Act of 1990. The number of implemented DOT-sponsored mitigation banks that received significant federal funding and planned banks that expect to receive federal funding under the terms of this Act was not determined.

**Counties**

Four county-sponsored mitigation banks are in the planning phase. In the effort to address regional development pressures and environmental issues, county planners are exploring the possibilities of establishing mitigation banks. Potential banks are
proposed as mitigation for general development activities in three counties. A proposed bank in Hillsborough County, Florida is designed to address impacts associated with county highway and capital improvement projects.

**Proposed County-Sponsored Banks:**
- Hillsborough County Mitigation Bank, Florida
- Placer County Mitigation Bank, California
- Sacramento County, California
- Lorain County, Ohio

In areas where there is a great deal of development pressure, it may be in county planners' interest to sponsor mitigation bank efforts. By sponsoring a bank, planners can identify areas where development will be allowed to occur and establish appropriate mitigation sites based on community planning goals. Mitigation banks can be implemented at predetermined degraded sites considered to be of potentially high resource value. If areas slated for development have low resource values, but development activities require some type of compensation, the county may potentially achieve a net improvement to the environment by restoring a large area with potentially high resource values.

**Habitat-Specific Mitigation Banks**

The Pridgen Flats and Pine Flatwoods mitigation banks, proposed in FWS Region Four, are specifically designed to preserve and enhance habitats considered to be of high resource value. These habitats require management to maintain biodiversity and other
resource values. Bank credits established by these banks will be used only to mitigate for losses to those habitats. In cases where a certain type of habitat is jeopardized by development and an opportunity to restore a large area of similar habitat is available, this type of mitigation bank can work to increase the value and function of the habitat resource base. Through the imposition of time frames for success and ratio-based accounting over time, regulators can restrict use of the bank and ensure that there are no losses to the resource base. As with all restoration projects, specific criteria need to be developed to judge performance. By setting up a bank for a particular habitat, agencies may have a greater degree of certainty that impacts will be successfully compensated.

**Private Mitigation Banks**

Two proposed private mitigation banks, both on former plantations in Georgia, have reached fairly high levels of development, and interest in private mitigation banking appears to be growing. The entrepreneurs envision a profit-making operation, in which developers buy mitigation credits earned through the entrepreneurs' restoration activities. Credits generated by the restoration of these sites would be made available for general development activities after all avoidance and minimization steps have been taken, off-site mitigation is determined to be appropriate and an alternatives analysis conducted. The WET, Inc. bank proposes
the establishment of a five-year escrow account, to ensure compliance with monitoring and maintenance programs. Credits would become available for purchase when restoration activities are completed. In a sense, the Fina/LaTerre mitigation bank can also be considered a private bank, as credits are sold to area developers with similar mitigation needs.

During the course of interviews, the subject of private mitigation banks was often raised. While there appears to be a great deal of interest in the idea, a number of reservations were expressed. What happens if a private mitigation bank goes bankrupt? If all of the mitigation credits are sold upon completion of restoration plans, what would happen if there unanticipated problems that required funding for rectification, which exceeded that available in the escrow account? Who would assume responsibility for the cost and management of a failed mitigation site? Furthermore, if credits were sold at the time restoration activities were completed, and the restoration project failed, there could be potentially large losses to the resource base.

In addition to practical issues, private mitigation banking raises some serious philosophical issues. Private mitigation banks create a market for wetlands losses, by offering a developers an opportunity to pay for habitat losses. Entrepreneurs would develop private mitigation banks primarily to make money, not to enhance public values. Given the high investment that would be required to develop a private mitigation bank, there would likely be considerable
pressure to use these banks. Looking at it from a different perspective, there would be pressure for wetland losses elsewhere.

Many mistakes have been and continue to be made in mitigation banking attempts, and in mitigation projects, in general. The level of expertise in wetland restoration and in developing mitigation bank programs has not progressed to a point where successful private mitigation banks can be assured. It is important for regulators to take a cautious approach to the development of restoration plans and the details of any private mitigation bank agreement. The Wet, Inc. agreement allows for use of the bank in lieu of onsite mitigation in some cases. The agreement also gives 100 percent credit upfront because of the monitoring and maintenance guaranteed by the escrow account. This seems to be risky for a first attempt at private mitigation banking, but resource agencies in the region have considerable experience, both good and bad, with mitigation banking.

Summary of Inventory

As the number of mitigation banks continues to grow, implemented banks have met with various degrees of success. Using credit balance information and looking at the extent to which mitigation projects have achieved objectives, twelve of the seventeen active and defunct mitigation banks can be called successful. Five banks have been unsuccessful. For most of the successful mitigation banks, appropriate sites were identified, detailed restoration plans were developed, and solid bank
agreements which addressed key issues were negotiated. No one group of mitigation banks stood out as having a greater success rate than the others. Rather, it appears that success can be attributed to sound mitigation project planning and well written bank agreements in individual cases. Table 7 summarizes the inventory results contained in Chapter Five and discussed in this Chapter.

It is important for proposed mitigation banks to learn from the mistakes and successes of earlier mitigation banks. Models, in the form of both good and bad previous bank efforts, exist and can aid in the development of mitigation banks designed to meet any number of objectives. As the number of proposed and implemented mitigation banks grows, it is in the interest of anyone involved in the development of a mitigation bank to study other banks. Problems encountered with similar banks may be avoided or sponsors may find that, for unanticipated reasons, a proposed bank is not feasible. In any case, being familiar with what is involved in restoration and negotiating an agreement could save time and ultimately lead to more successful mitigation banks. It is hoped that the experiences of other banks will be taken into account when developing new banks, and that inventories such as these will assist bank sponsors in efforts to locate similar mitigation banks which can serve as models.
### TABLE 7

#### SUMMARY OF BANK ACTIVITY

<table>
<thead>
<tr>
<th>Bank Name/Sponsor</th>
<th>Location</th>
<th>Status</th>
<th>Bank Objectives</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astoria Airport / Port of Astoria</td>
<td>Clatsop, Oregon</td>
<td>active</td>
<td>shallow water dredging impacts</td>
<td>habitat didn't turn out as planned</td>
</tr>
<tr>
<td>Anaheim Bay / Port of Long Beach</td>
<td>Seal Beach NWR</td>
<td>defunct</td>
<td>project specific</td>
<td>performed as planned</td>
</tr>
<tr>
<td></td>
<td>approximately 10 miles south of port</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batiquitos Lagoon / Port of Los Angeles</td>
<td>Northern San Diego County</td>
<td>planned</td>
<td>port development</td>
<td>continued planning problems</td>
</tr>
<tr>
<td>Beach Lake / Caltrans</td>
<td>Sacramento Cty. CA</td>
<td>planned</td>
<td>highway projects</td>
<td>n/a</td>
</tr>
<tr>
<td>Bonneville / Bureau of Reclamation</td>
<td>Duchense and Wasatch Cts., Utah</td>
<td>defunct</td>
<td>project specific</td>
<td>performed as planned</td>
</tr>
<tr>
<td>Bracut Marsh / California Coastal Cons.</td>
<td>Humboldt Bay, Eureka, CA</td>
<td>almost</td>
<td>small development</td>
<td>has not performed as planned</td>
</tr>
<tr>
<td>Company Swamp / North Carolina DOT</td>
<td>Lower Roanoke R., uncertain Bertie County, NC</td>
<td>defunct</td>
<td>impacts in ind. area</td>
<td></td>
</tr>
<tr>
<td>Fina - LaTerre / Fina Oil Co.</td>
<td>Terrebone Parish, active Louisiana</td>
<td></td>
<td>oil and gas exploration impacts</td>
<td>credit balance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>severe accounting problems</td>
</tr>
<tr>
<td>Bank Name/Sponsor</td>
<td>Location</td>
<td>Status</td>
<td>Bank Objectives</td>
<td>Performance</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------------</td>
<td>---------</td>
<td>-------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Goose Creek/Virginia DOT</td>
<td>Chesapeake, VA</td>
<td>active</td>
<td>highway projects</td>
<td>credit balance</td>
</tr>
<tr>
<td>Hillsborough County</td>
<td>Hillsborough Cty. Florida</td>
<td>planned</td>
<td>highway &amp; utility projects</td>
<td>n/a</td>
</tr>
<tr>
<td>Idaho DOT</td>
<td>Statewide</td>
<td>active</td>
<td>highway projects</td>
<td>credit balance</td>
</tr>
<tr>
<td>Louisiana DOT</td>
<td>Grant and LaSalle Parishes, LA</td>
<td>uncertain</td>
<td>highway projects</td>
<td>severe problems with management</td>
</tr>
<tr>
<td>Marshlands Plantation/ WET, Inc.</td>
<td>Camden County, GA</td>
<td>planned</td>
<td>private bank</td>
<td>n/a</td>
</tr>
<tr>
<td>Maryland State Hwy. Adm.</td>
<td>Statewide</td>
<td>planned</td>
<td>highway projects</td>
<td>n/a</td>
</tr>
<tr>
<td>Milhaven Plantation/ Walter Stevens</td>
<td>Screven County, GA</td>
<td>planned</td>
<td>private bank</td>
<td>n/a</td>
</tr>
<tr>
<td>Minnesota DOT</td>
<td>Statewide</td>
<td>active</td>
<td>highway projects</td>
<td>has routinely operated at a deficit</td>
</tr>
<tr>
<td>Mississippi State Hwy. Dept.</td>
<td>Statewide</td>
<td>active</td>
<td>highway projects</td>
<td>credit balance</td>
</tr>
<tr>
<td>Montana DOT</td>
<td>Statewide</td>
<td>active</td>
<td>highway projects</td>
<td>credit balance</td>
</tr>
<tr>
<td>New Jersey DOT</td>
<td>Statewide</td>
<td>planned</td>
<td>highway projects</td>
<td>n/a</td>
</tr>
<tr>
<td>Bank Name/ Sponsor</td>
<td>Location</td>
<td>Status</td>
<td>Bank Objectives</td>
<td>Performance</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Newport Bay/</td>
<td>Upper Newport</td>
<td>defunct</td>
<td>project specific Pier A/Berth 83</td>
<td>performed as planned</td>
</tr>
<tr>
<td>Port of Long Beach</td>
<td>Bay Ecological Res.</td>
<td>Newport Beach, CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Dakota State Hwy. Dept.</td>
<td>Statewide</td>
<td>active</td>
<td>highway projects</td>
<td>credit balance</td>
</tr>
<tr>
<td>Otter Dam Swamp/</td>
<td>Greenville Cty., VA</td>
<td>active and planned</td>
<td>highway projects</td>
<td>credits have been used; agreement not yet signed</td>
</tr>
<tr>
<td>Virginia DOT</td>
<td>VA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrick Lake /</td>
<td>East Dane County,</td>
<td>planned</td>
<td>highway projects</td>
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CHAPTER SEVEN
INTERVIEWS

Hypothesis and Methods

It has been hypothesized that sponsors of implemented mitigation banks continue to have a generally positive attitude toward mitigation banking in spite of difficulties associated with bank planning and implementation. Little research has been conducted to determine whether proposed benefits and problems have been manifested. If the results of efforts, in the opinion of bank sponsors and the regulatory community, have justified the effort and cost required to develop mitigation banks, then continued interest in mitigation banking can be expected and further research is warranted.

In order to test the hypothesis, telephone interviews were conducted with contacts made at resource agencies and with developers during the inventory research. The object of this section of the research was to gain a general idea of attitudes toward mitigation banking held by individuals with experience in bank negotiation and implementation. The basic research question is, do
individuals with experience in mitigation banking feel that mitigation banking is achieving theoretical benefits?

The justification for examining benefits and problems associated with mitigation banking through an analysis of attitudes is twofold. First, although empirical evidence could conceivably be gathered to determine whether mitigation banking has, for example, generally reduced permit processing times, the compiling and analysis of necessary data would require a massive research effort, which at this point, may not be warranted. Second, and as a result of this limitation, exploratory research on attitudes toward mitigation banking was determined to be appropriate. It is assumed that present attitudes will affect future behavior. As an illustration, a developer may sponsor a mitigation bank with a goal of reducing permit processing times. When the developer applies for a permit for which bank credits will be used, the Corps finds an error in the permit application and the issuing of the permit is delayed. The issue of bank use is irrelevant to the delay. Nonetheless, the permit applicant does not achieve the goal of reducing permit processing times and may have a negative view of mitigation banking's ability to streamline the permit process. The assumption is that the developer's perception of the situation will be reflected in a reduced interest in mitigation banking.

Interviews combined two types of exploratory research methods. The first of these is an experience survey in which individuals who are knowledgeable about a particular research topic are questioned. An attempt was made also to incorporate focus group methods
through flexibility in discussions. While a focus group is just that, a
group, similar techniques were used to encourage discussion and
gain insights. General interview results have been incorporated into
the discussion of the mitigation bank inventory.

A questionnaire was administered to eleven contacts
representing developers and various resource agencies throughout
the U.S. (See Table 8). A larger sample had been planned but, it was
found during the course of the research that a predetermined
interview format was inappropriate, in many cases, and that better
insight would be gained through a free-flowing discussion. In spite
of limitations resulting from the small sample size, the results of
the questionnaire are valuable as exploratory research.

The questionnaire consists of six statements to which contacts
were asked to respond. The first five of the statements utilize a
Likert Scale. The Likert Scale is a format where respondents are
asked to indicate whether they "strongly agree", "agree", "disagree",
"strongly disagree" or have no opinion on a statement. The use of a
Likert Scale is limited because it does not measure intensity of
response. Nonetheless, the Likert Scale is a relatively easy method
for determining general attitudes and is well suited for this thesis.
The sixth statement is an open-ended question, as it provides an
opportunity for contacts to choose from a series of responses or
supply one of their own.

Statements included on the questionnaire were designed to
assess perceptions of mitigation banking problems and benefits. The
first statement is directed at the suggested benefit of better
1. Mitigation banking has led to better (more cooperative) regional planning among developers and regulators in your region.

2. Mitigation banking has reduced permit processing times.

3. The effort involved in negotiating a bank agreement is justified by the results.

4. Citizen and interest groups have generally supported bank efforts.

5. Compensation through the use of mitigation banking is less expensive than traditional mitigation.

6. The greatest problem experienced with this mitigation bank has been:
   - cost of the mitigation project
   - unresolved issues not addressed in the bank agreement
   - finding appropriate mitigation sites
   - negotiation of the actual agreement
   - other

<table>
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<td>1. Mitigation banking has led to better (more cooperative) regional planning among developers and regulators in your region.</td>
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<td>2. Mitigation banking has reduced permit processing times.</td>
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<tr>
<td>3. The effort involved in negotiating a bank agreement is justified by the results.</td>
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<td>4. Citizen and interest groups have generally supported bank efforts.</td>
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<td>5. Compensation through the use of mitigation banking is less expensive than traditional mitigation.</td>
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<td>6. The greatest problem experienced with this mitigation bank has been:</td>
</tr>
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<td>- cost of the mitigation project</td>
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<td>- unresolved issues not addressed in the bank agreement</td>
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<td>- finding appropriate mitigation sites</td>
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<td>- negotiation of the actual agreement</td>
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<tr>
<td>- other</td>
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</table>

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regional planning as a result of mitigation banking. Statement Two addresses the proposed benefit of reduced permit processing times. Statement Three addresses the potential problems associated with the negotiation of a bank agreement. Statement Four addresses the potential problems or benefits associated with public opposition or support of mitigation banks. Statement Five is designed to see if contacts believe compensation through the use of mitigation banks is less expensive than traditional mitigation projects. Statement Six is designed to get a general idea of the major problems associated with mitigation banking.

The identities of questionnaire respondents have been kept confidential to ensure that individual attitudes, rather than organizational rhetoric, could be expressed. The responses are analyzed generally by question and subsequently broken down in two ways. The responses of developers and the regulatory community are separated and compared. A comparison is also made between those respondents involved in DOT-sponsored mitigation banks and all others. A similar comparison of port-sponsored mitigation banks was not possible due to the small number of ports involved in mitigation banking.
Results

Statement One: Mitigation banking has led to better (more cooperative) regional planning among developers and regulators in your region.

An equal number of respondents agreed and disagreed, and strongly agreed and strongly disagreed with this statement. Graphically, the responses would be represented by a normal, bell curve. Developers agreed slightly that mitigation banking had led to better regional planning, while the regulatory community showed an equal level of disagreement with this statement. For both developers and regulators, the average level of agreement or disagreement was low. Respondents involved in DOT-sponsored mitigation banks, as a group, showed the highest degree of agreement with this statement. Responses of those involved in mitigation banks which are not DOT-sponsored canceled each other out when averaged to result in no opinion.

Statement Two: Mitigation banking has reduced permit processing times.

Once again, an equal number of responses were obtained for each side of this statement. When averaged, the responses resulted in no opinion for the sample as a whole. While developers agreed, regulators tended to disagree with the statement. When the sample was broken down into DOT-sponsored banks and all others, no opinion
among respondents affiliated with DOT-sponsored banks and slight disagreement to the statement among all others was found.

During the course of interviews, many contacts expressed a belief that mitigation banking had not reduced permit processing times. Several, however, did say that the existence of a mitigation bank has increased the chances of eventually getting a permit.

**Statement Three:** The effort involved in negotiating a bank agreement is justified by the results.

Respondents agreed that the effort involved in negotiating a bank agreement is justified by the results. Only one respondent disagreed with this statement and no respondents strongly disagreed with the statement. Two respondents had no opinion. Developers agreed more strongly than the regulatory community with the statement and respondents involved in DOT-sponsored banks showed the highest degree of agreement with this statement.

The responses can be interpreted in different ways, depending on what the respondent had in mind as the results of negotiating a bank agreement. Are the results good mitigation banking guidelines, which can be referred to and implemented through the life of the bank, or are they good mitigation banks? Performance of banks with which respondents are affiliated are mixed. Responses could have been based on past bank problems which arose and had been neglected or inadequately addressed in the bank agreement. Responses were also based on anticipated results from those involved with banks which have not been fully implemented.
Regardless of how "results" were interpreted, respondents overwhelmingly agreed on the importance of a strong bank agreement.

**Statement Four:** Citizen and interest groups have generally supported bank efforts.

Responses to this statement plot as a normal curve, and when averaged, cancel each other out to result in no opinion. The same holds true when responses are separated into developers and the regulatory community. Respondents associated with DOT-sponsored banks agreed slightly with the statement while all others disagreed to the same extent.

A problem with this statement was discovered during the course of the interviews. It was assumed that citizen and interest groups would represent a conservationist point of view. As it was pointed out, some of these groups may represent development interests.

**Statement Five:** Compensation through the use of mitigation banking is less expensive than traditional mitigation.

Of the eleven total respondents, five had no opinion on whether mitigation banking provided a cost savings. Similarly, three of five respondents representing developers had no opinion on this statement. When responses were broken down into DOT-related and all other banks, it was shown that respondents affiliated with DOT-sponsored banks showed a relatively high degree of agreement with this statement.
Statement Six: The greatest problem experienced with this mitigation bank has been....

A choice of responses was provided for the above statement. They included cost of the mitigation project, unresolved issues not addressed in the bank agreement, finding appropriate mitigation sites, and negotiation of the actual agreement. There was also an opportunity for respondents to supply their own, more appropriate response. Several respondents asked if there were an "all of the above" response.

The most frequent response, with a rate of four, was unresolved issues not addressed in the bank agreement. Generally, these unresolved issues pertained to specifics such as monitoring requirements, credit and debit procedures, and guidelines for using the bank. Two respondents identified both negotiation of the actual agreement and unresolved issues as the greatest problems experienced. Problems which had not been resolved during negotiation of the agreement had been carried into bank implementation. Negotiation of the bank agreement was identified by three respondents as the greatest problem, and was the second most frequent response. One respondent chose finding sites as the greatest problem experienced.

Among the responses that were supplied were staff time to implement, philosophical differences between regulatory agencies and monitoring success. One respondent answered all of the above with the exception of negotiating the agreement as the other
suggested problems had prevented progress to the point where an agreement could not be negotiated.

Summary

A summary of questionnaire responses is contained in Table 9. While the value of this questionnaire is limited by the small sample size, it provides some useful insights on benefits and problems associated with mitigation banking and certain general conclusions can be made.

Overall, respondents were neutral on the question of whether mitigation banking leads to better regional planning. Respondents did not agree with the statement that mitigation banking reduces permit processing times. Yet, this has been one of the major benefits of mitigation banking proposed. There was strong agreement that the effort involved in negotiating a bank agreement is justified by the results. Perceptions of interest and citizen group support were neutral on average, although some respondents did express strong opinions. Interestingly, there was a high rate of no opinion in the responses to the statement that compensation through the use of mitigation banking is less expensive than traditional mitigation. Negotiation of the actual agreement and unresolved conflicts, not addressed in the agreement, were the most frequently sited problems associated with banks.

In general, developers who have sponsored bank efforts responded positively to the statements. Given the limitations of the
# TABLE 9

## QUESTIONNAIRE RESPONSES

### KEY

**Code:**
- A = developer
- B = resource agency personnel
- C = DOT affiliated
- D = non-DOT affiliated

### Statements:
- sa = strongly agree
- a = agree
- sd = strongly disagree
- d = disagree
- no = no opinion

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questionnaire, and based on an analysis by respondent and by statement, the hypothesis that sponsors of implemented mitigation banks continue to have a generally positive attitude toward mitigation banking can be accepted. Statement Two, "mitigation banking has reduced permit processing times", is the only statement which averaged a negative response from developers. Regulatory community responses, with the exception of Statement Three, ranged from neutral to negative. In some cases, it seemed as though the regulatory community had been reluctantly drawn into mitigation banking.

More than any other group, in the opinion of respondents, DOT-sponsored banks were able to engage in better regional planning, gain the support of citizen and interest groups, and reduce costs. The responses of respondents affiliated with DOT-sponsored banks were compared with West Coast respondents in order to further test the hypothesis that ports have had the greatest degree of success with mitigation banking. The only ports involved in mitigation banking are on the West Coast and individuals with experience in port mitigation banks thus responded to the questionnaire. The results of this comparison confirmed the previous rejection of the hypothesis. The results indicate that, in the opinion of those involved in bank efforts, DOT-sponsored banks have met with the greatest degree of success.

Respondents overwhelmingly agreed that the effort involved in negotiating a bank agreement is justified by the results. No other statement had nearly as high a rate of agreement or disagreement.
This was a somewhat surprising finding because, it seemed that during the course of the interviews, there was quite a bit of discussion on problems that had been experienced. Through the negotiation of a strong mitigation bank agreement, parties may ensure that their best interests are represented. In the opinion of both sponsors of banks and the regulatory community, the negotiation of a solid bank agreement is critical to, but does not exclusively guarantee, bank success.
CHAPTER EIGHT

CONCLUSIONS

In spite of an increase in the number of planned and implemented mitigation banks in the U.S., as had been hypothesized, port use of mitigation banking has not been as expected. Permits for maintenance and project dredging do not generally require compensatory mitigation. As a result, the suggested benefit that ports can consolidate mitigation requirements for small dredging projects has not been achieved. For port expansion projects, the high cost of land, the difficulty of locating appropriate and practicable sites and an antagonistic regulatory system has constrained the use of mitigation banking. For these reasons, the hypothesis that ports have met with the greatest degree of success with mitigation banking has been rejected. While mitigation banking may have a role to play in port development, long-term planning, which supports regional development goals and productive interaction with the regulatory community, is more fundamental in reducing port-related mitigation costs and problems associated with the permit process.

The negotiation of appropriate mitigation to avoid, minimize, and compensate for environmental losses associated with development can be extremely difficult, particularly for large port
expansion projects. The type of consensus building required among agencies which represent a myriad of interests is, at times, an impossible task. Even with cooperation between developers and resource agencies on long-term planning, the case-by-case approach used by the Corps in permit decisions and lawsuits, brought by special interest groups, can delay the issuance of permits indefinitely and prevent plans from being implemented without further modification and compensation requirements. The availability of suitable restoration sites, which is restricted by high land and restoration costs, prior development and the existing resource base, also can limit or delay development. Further, ports are hesitant to make commitments to restoring large areas of wetlands when they are unable to receive credit for the entire site. The problems associated with appropriate mitigation for port-related fill projects need to be resolved. Otherwise, ports will have little incentive to increase the resource base, whether it be through mitigation banking or not. Current port mitigation requirements, which recognize only the increased values of subtidal and intertidal areas, and not related upland or peripheral areas, do not encourage the highest overall increase in habitat values and constrain port expansion projects.

Mitigation needs to be included from the conceptual to the implementation phases of port development plans and consequently, expansion-oriented ports must be continuously involved in the pre-application phase of the permit process. Port planners need to know what types of design modifications and compensation will be
required by the regulatory community in order to determine the feasibility of development plans. The identification, negotiation and implementation of suitable mitigation for port expansion often becomes as big a project as the related development. Expansion oriented ports need to seize opportunities to develop appropriate mitigation sites as they arise, even when a site has not been linked to a particular development project. When a large site with potentially high resource values is identified as a good candidate for restoration and is within a reasonable distance from the port, mitigation banking can produce environmental benefits to the community while satisfying future development needs.

The number of DOT-sponsored mitigation banks has experienced a high rate of growth. This may be attributable to the Surface Transportation Act of 1990 which provides federal funding for mitigation banks, but also can be linked to the nature of highway development projects and the availability of bank sites. DOTs are often forced to purchase large parcels of land for lineal rights of way. In many of the cases reviewed, DOTs and resource agencies recognized the potential value of areas for restoration and mitigation banking. As a result, many DOTs have been able to consolidate mitigation requirements of small losses while, at the same time, providing a net habitat improvement.

The development of mitigation banks designed to meet regional development needs by counties also offers some promise for enhancing the resource base. In these cases, losses in areas
designated for development and of low resource value can be compensated for while regional restoration goals are be addressed.

The concept of mitigation banking is a double-edged sword. Although the goal is to achieve no net loss through the enhancement of habitat values by providing compensation for losses associated with development, mitigation banking carries with it an implicit recognition of future wetland losses. Private mitigation banks put a market value of these future losses. Private mitigation banks must be tied to regional development plans and monitored very closely. Problems associated with mitigation banks, and mitigation projects in general, have not been fully resolved and the opportunity for disaster exists with private mitigation banks. The fear that all avoidance and minimization in development project planning will be neglected is exacerbated by the potential pressure to use private mitigation banks.

Two elements are critical to successful implementation of mitigation banks. First, appropriate sites must be identified and specific restoration goals articulated. By requiring the articulation of specific restoration goals, bank planners may find that bank plans are unfeasible and costly mistakes can be avoided. Second, a well written mitigation bank agreement is essential. Broad mitigation bank agreements, similar to some of those being developed on statewide basis, and which provide only generic guidelines for mitigation banking are inadequate for ensuring success. Specific details on, for example, monitoring requirements, what types of losses will be eligible for bank credits, criteria and time frames for
success, and management responsibilities, need to be included in either the bank agreement or permits issued for bank restoration activities. When appropriate sites are restored and solid bank agreements developed, mitigation banking can improve success rates at mitigation sites and provide a better alternative to traditional mitigation.

Mitigation banking raises a basic economic question: Are mitigation banks good investments for developers? (King, 1991, p. 12). In some cases, the costs of acquiring and developing a bank site are not justified by the demand for development. Bank sponsors and the regulatory community need to carefully analyze the long-term costs and benefits of a proposed mitigation bank prior to entering into any agreement.

The proposed advantages of mitigation banking have not been fully realized. Nonetheless, based on interviews and questionnaire responses, bank sponsors continue to have a generally positive attitude toward mitigation banking, as had been hypothesized. Continued interest in mitigation banking can be expected and further research is warranted.

In his 1990 Wetlands Policy Statement, President Bush supported the concept of mitigation banking in policy. Since that time, there has been a flurry of activity on the federal level. A Domestic Policy Task Force, composed of representatives from all pertinent agencies, is currently working on wetland policy guidelines and includes a mitigation banking subcommittee. In addition, the Corps, EPA, and FHA are each working on their own mitigation banking
studies and guidelines. Certainly, mitigation banking, as a policy, has value and federal guidelines for its use are necessary. There are many instances where mitigation banking has led to definite environmental improvements. Practically, however, the opportunities for successful mitigation banking are limited and support of the concept may be inappropriate. Specific details of development project and mitigation bank objectives, as well as criteria for success and bank use, need to be addressed in order to determine the appropriateness of utilizing mitigation banking. The existence of a mitigation bank cannot be perceived as providing blanket approval of development projects. The sequencing guidelines provided in Section 404 must be strictly adhered to regardless of the existence of mitigation banks.

Mitigation requirements imposed on ports, as a result of Section 404 and Section 10, continue to affect a port's ability to effectively respond to market demands and, as a result, impede port development. While cooperative regional planning may reduce long-term mitigation costs and reduce problems associated with the permit process, ports do not have a means of expeditiously adjusting to changes in maritime commerce in order to remain competitive. The level of service a port can provide, which will determine its use, remains largely dependent on the environmental goals rather than the economic goals of the community. Mitigation banking has not been an effective solution for alleviating problems associated with port mitigation requirements. However, the potential for ports to utilize mitigation banking remains and should not be overlooked.
given the existing problems associated with port mitigation requirements.
APPENDIX A
COMPARISON OF INVENTORIES AND STATUS

a - denotes active at time of inventory
p - denotes bank was in planning phase at time of inventory
d - denotes bank was defunct at time of inventory
u - denotes an unclear status

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