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Design of U.S. Habitat Banking Systems to Support the Conservation of Wildlife Habitat and At-Risk Species

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Executive Summary

A variety of laws at all levels of government seek to conserve various natural resources, such as wetlands or endangered species habitat, by restricting the right to carry out actions that adversely affect them. A common feature of these and many other environmental statutes is that they typically allow an otherwise prohibited activity (the filling of a wetland or the harming of an endangered species) if the adverse effects of that activity are sufficiently offset – or "mitigated" – by appropriate compensatory measures. One way for permittees to satisfy their compensatory mitigation obligations is through habitat banking – wetland mitigation banking, conservation banking, or other banking systems. The amount of funds that are directed to compensatory mitigation on an annual basis in the U.S. is significant.

The purpose of this report is to assess the potential for habitat banking to contribute to the conservation of priority habitats identified in the state wildlife action plans. These plans, available in all 50 states, identify each state's at-risk species, the habitats on which they depend, actions to conserve the species and their habitats, and, with varying degrees of specificity, strategies to achieve those priorities.

The recently developed state plans set ambitious conservation goals that expand the focus of state wildlife agencies well beyond traditional "game" species and endangered species. Although there are many opportunities for existing and new habitat banking programs to conserve the critical wildlife habitat identified in the state wildlife action plans, the great majority of plans say nothing at all about the topic of habitat banking. Indeed, only eleven plans make any reference to habitat banking and in five of these states, the only reference to banking is relegated to the appendices rather than the main body of the plan. Nevertheless, habitat banking has the potential to help states conserve many of the priority species and habitats identified in their state wildlife action plans.

This report offers state wildlife planners, state habitat banking program managers, and other decision-makers with recommendations on how to utilize existing habitat banking programs, establish new banks under existing authorities, or launch new habitat banking systems to support the protection of critical wildlife habitat identified in the state wildlife action plans. This report also provides general recommendations for advancing the use of banking for wildlife conservation purposes.

Recommendations for Existing Habitat Banking Programs

Because of their established status, wetland mitigation banking and conservation banking may offer the most immediate opportunities to direct mitigation activities to protecting critical wildlife habitat.

Wetland Mitigation Banks

Wetland mitigation banks established under the Clean Water Act can support the conservation of priority habitats in the state plans through: (1) siting and designing banks to protect critical wildlife habitat; (2) managing banks to protect critical wildlife habitat; and (3) incorporating the goals of the wildlife action plans into the watershed approach to compensatory mitigation decision-making.

Guide wetland mitigation bank siting and design

Ultimately, decisions about where to site and how to design wetland mitigation banks rest with the bank sponsor. Although federal and state agencies have limited ability to direct banks to particular locations, the bank sponsor interacts with the federal interagency group (the Mitigation Bank Review Team or MBRT) that approves and oversees the operation of banks several times before the bank is approved to sell credits. Through these early interactions, the MBRT can have a significant influence on issues related to bank siting and design.

It is within the discretion of individual states whether or not the state wildlife agency plays a lead role on the MBRT, but the more involved the agency is, the more leverage it will have in guiding the development of state or district-wide bank guidance documents that support the conservation objectives of the state plans. State wildlife agencies that serve on an MBRT can also help guide the location and design of proposed banks, incorporate criteria from the state plans into the bank review process and ensure that the bank takes key wildlife habitat and species of greatest conservation concern into account.

Influence wetland mitigation bank management

Performance standards – the measurable outcomes of wetland compensatory mitigation projects – play a key role in the design and management of wetland mitigation banks. A bank's monitoring requirements, credit release schedule, and

financial assurances are often tied to meeting performance standards. Through working with or serving on the MBRT, state wildlife agencies can play a lead role in designing performance standards for wildlife criteria – particularly those standards that address the needs of the wetland species listed as species of concern in the state wildlife action plan that are likely to be present at the site.

Incorporate the goals of the state wildlife action plans into the watershed approach

A shift in federal policy on how bank siting decisions are made could support an increase in the number of banks located on properties identified as priority wildlife habitat. Under the watershed approach outlined in proposed regulations issued jointly by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers in 2006, federal wetland mitigation site selection decisions should be based on an analysis of the condition and needs of the watershed. The proposed rule suggests that the watershed approach should consider, among other things, "habitat requirements of important species." Further, the proposed rule indicates that data on current trends in habitat loss or conversion and the presence and needs of sensitive species should be utilized when taking the watershed approach. State wildlife action plans can serve as an excellent source of information on the presence and needs of sensitive species for the habitat analysis. Relying upon the watershed approach to guide selection of bank sites can help contribute to maintaining habitat diversity, connectivity, and appropriate proportions of habitat types needed to enhance the long-term stability of the priority wildlife habitats identified in the state plans.

Conservation Banks

Conservation banking can support the conservation of priority habitats in state wildlife action plans by integrating plan goals in the siting and management of conservation banks established pursuant to the Endangered Species Act.

Influence the siting and management of banks established pursuant to the Endangered Species Act

Although the ultimate responsibility for approving conservation banks under the Endangered Species Act rests with a federal agency, states can be influential in affecting both the siting and management of such banks. To the extent that there is overlap between areas identified in state plans as conservation priorities and areas that support – or may be capable of supporting – federally listed species, banking offers an opportunity to meet federal regulatory requirements while concurrently advancing state conservation objectives.

The opportunities available to states are greatest when, in addition to the requirements of the Endangered Species Act, there are state regulatory requirements that can be met through the sale of credits from a bank. In these cases, it is clear that the U.S. Fish and Wildlife Service's banking guidance contemplates that states will be invited to help oversee the establishment, use, and operation of a bank. However, even if a state does not have regulatory requirements of its own that are to be met though the use of bank credits, states can work informally with their federal counterparts to identify areas where banks would be particularly useful. States can also work with their federal counterparts to ensure that crediting methodologies and management plans for banks take into account state expertise and objectives.

There are, however, limits to how much influence states can have over the siting and management of federally approved conservation banks. If priority habitats identified in state plans do not support federally listed species, or if there is no development pressure stimulating demand for credits associated with the listed species that they do support, there will be no opportunity to use federal conservation banks as a way of protecting those priority habitats. Even when state priority habitats do support federally listed species for which there is development-driven demand for credits, bankers may choose to establish their banks at other sites. As with wetland mitigation banking, neither the states nor the federal agencies can require that a privately initiated bank be sited at a particular location. At most, through their development of a crediting methodology and their ability to require certain management practices, they can hope to influence a banker's selection of a bank site.

Recommendations for New Habitat Banks Under Existing Authorities

There are several opportunities for states to utilize existing regulatory mechanisms, some of which already require compensation for impacts to the environment, such as state endangered species statutes, state wetland laws, or environmental impact assessment laws, to establish new habitat

banks or habitat banking programs that could contribute to the conservation of priority habitats. New banking programs can support the protection of priority wildlife habitat by: (1) establishing state-sponsored banks; and (2) creating incentives for banks to be sited in priority conservation areas.

Establish state-managed banks in priority conservation areas

If a state agency itself becomes a bank sponsor, then, like other bankers, it can propose the location of its banks. By establishing their own banks, states may be able to leverage funds from private development interests, or as is already the case in several states, from state-sponsored public infrastructure projects. As bank sponsors, states can help to steer these mitigation dollars toward priority wildlife habitat identified in the state wildlife action plans. State wildlife agencies may also be able to collaborate with their landowning sister agencies to establish banks on state lands not currently being managed for conservation purposes. Such an approach, would, of course, be subject to the authorities in existing state law.

Create incentives for banks to be sited in priority conservation areas

Many existing state laws impose regulatory requirements that include a duty to provide compensatory mitigation for impacts from certain development activities. The potential exists to meet such regulatory obligations through banking. Since the state will design the rules for banking pursuant to the state law, the state can make sure that those rules further the conservation priorities of its state wildlife action plans. For example, a state might allow certain conservation banks to be established only in areas designated as priority conservation areas in the state plan. Alternatively, a state might allow the siting of conservation banks anywhere, but reward those sited in priority conservation areas through the use of a crediting methodology that gives extra credit for banks sited in such areas. That same crediting methodology could also discourage development in conservation priority areas by requiring developments there to be offset with more credits than would be required of a comparable development elsewhere.

Recommendations for New Habitat Banking Systems

Impacts to the environment from land development and land use practices are widespread and frequent. Only a small fraction of those impacts, however, require compensatory activities to offset permitted damage. By adopting new federal and state provisions that require compensation for impacts to other habitat types or species, public agencies can more effectively seek offsets for impacts to the environment that currently go unaddressed. As with new banking programs, new banking systems should also rely upon the set of effective banking practices outlined in this report.

General Recommendations for Habitat Banking Programs

Future iterations of the state wildlife action plans or ancillary efforts can more effectively support wildlife conservation by: (1) providing greater specificity as to the location of priority habitats; (2) more fully considering the role that banking can play as a conservation action; and (3) providing information on habitat restoration opportunities.

Provide greater specificity as to the location of priority habitats

The ability of states to take advantage of opportunities to further the conservation of priority habitats through banking may ultimately depend on the specificity of the state plans. Future generations of plans, or ancillary efforts undertaken to supplement existing plans, might more effectively support the use of banking by including more specific information on the location of critical wildlife habitat.

More fully consider the role that banking can play as a conservation action

Our review of the 50 state wildlife action plans revealed that only eleven state plans make any reference to habitat banking. In five of these states, the only reference to banking is relegated to the appendices and in four states the plans make only a single brief reference to banking. Future iterations of the plans should more fully explore the role that banking can play in meeting their conservation objectives.

Provide information on habitat restoration opportunities

For the state plans to effectively direct wetland mitigation banking, they should identify lands with high wetland restoration potential. Virtually all state plans identify wetlands as key habitat types and include maps of wetland habitat. In their current iteration, however, most of the wetland acreage that is identified in the plans is existing, high quality wetland habitat that retains much of its functional capacity. Although this is valuable information for wetland habitat acquisition, wetland mitigation providers more generally seek to identify opportunities to restore wetland acres, as these sites will generate far more wetland credits for sale. Few if any state plans identify wetland areas with high restoration potential. Future iterations of the plans should consider including such information. At least eight states have established programs that seek to identify and/or prioritize wetland acreage for its restoration potential. These restoration prioritization programs could be used to guide the inclusion of wetlands with high wildlife habitat potential in the state plans.

Introduction

A variety of laws at all levels of government seek to conserve various natural resources by restricting the right to carry out actions that adversely affect those resources. For example, the federal Clean Water Act, among its many provisions, prohibits the filling of wetlands without a permit issued by the U.S. Army Corps of Engineers (the Corps). The federal Endangered Species Act (ESA) similarly restricts actions that "harm" endangered wildlife. In most states, both of these federal laws are complemented by parallel state provisions authorizing similar, state-administered regulatory programs. A common feature of these and many other environmental statutes is that otherwise prohibited activities (the filling of a wetland or the harming of an endangered species) may be allowed if the adverse effects of that activity are sufficiently offset – or "mitigated" – by appropriate compensatory measures.

Historically, the approach taken under these and similar environmental laws was to require mitigation on a project-by-project basis. As each new regulated project was authorized by the regulatory agency, compensatory activities were required and mitigation was carried out to offset the permitted impacts. In time, both regulated interests and regulatory agencies came to believe that there may be mutual advantages to anticipating mitigation needs for future projects and to satisfying these mitigation requirements in advance of the anticipated projects. With appropriate safeguards, the thinking went, advance mitigation efforts could be carried out by permittees or third parties and authorized by the regulatory agencies. The mitigation could then be "banked" until the acreage was needed to meet the mitigation requirements associated with their own or another's future projects. Thus was born the idea of "wetland mitigation banking," as it is usually called in the wetlands context, or "conservation banking," as is often called in the context of endangered species. More broadly, both of these, and related efforts, are often referred to as "habitat banking."

The purpose of this report is to assess the potential for habitat banking to contribute to the conservation of priority habitats identified in the state wildlife action plans. These plans, available in all 50 states, identify each state's at-risk species, the habitats on which they depend, actions to conserve the species and their habitats, and, with varying degrees of specificity, strategies to achieve those priorities. Habitat banking is but one conservation tool potentially available for pursuing the plans' goals. Other conservation tools, such as land acquisition, purchase of conservation easements, purchase of development rights, land management and restoration, financial and non-financial incentives, and regulation, are likely to be more familiar to most conservation agencies. Nonetheless, habitat banking, which has many elements in common with the other conservation tools, may be a very useful tool to accomplish particular goals. This report aims to identify the circumstances in which habitat banking may be particularly useful and how banking might be most effectively utilized to further state wildlife action plan goals.

Wetland and Conservation Banking in Detail

General overview

The Origins of Habitat Banking

The origins of habitat banking can be traced, at least in part, to the perception that traditional approaches to mitigation had often produced unsatisfactory results. For example, traditional mitigation for small projects often yielded "postage-stamp" mitigation sites at or very close to the project site. These sites were often isolated from other ecologically significant areas and too small to manage and oversee efficiently. Habitat banking, its proponents claimed, offered a better opportunity to aggregate mitigation efforts at larger sites in a manner that afforded ecological, administrative, and financial efficiencies.

Traditional mitigation efforts were also often carried out concurrently with the project for which they were to mitigate, or even after the permitted impacts had occurred, leading to temporal losses of habitat acreage and function. If the mitigation effort failed, as was frequently the case, regulators were left with few options to rectify the failure. Here again, banking proponents pointed to a potential advantage of consolidated mitigation. They claimed that banking provided a better mechanism to ensure the success of mitigation efforts in advance of the negative impacts that required mitigation.

Habitat banking offered at least one other favorable attribute. It offered private landowners an opportunity to profit by investing in conservation activities on their land and then selling the credits they earned from their investment to third parties in need of mitigation credits. For the landowners, banking offered a means of turning a resource like a wetland or an endangered species into a potential asset rather than a liability. For the buyers, banking increased the range of available mitigation options.

Whether habitat banking in practice accomplishes the benefits suggested by the theory is a subject of active debate. Perhaps more important than whether habitat banking works as well as its proponents claim it does is whether it works better than other forms of mitigation. These other forms of mitigation include not only traditional, project-by-project, permittee-responsible mitigation (both on- and off-site), but also other third-party compensation mechanisms, such as in-lieu fee mitigation (see Chapter 4, "A Typology of Banks"). Whether alternative compensatory measures adequately compensate for authorized resource losses or whether they compensate as well as banking or other forms of mitigation are also subjects of considerable debate.

Thus far, the various types of habitat banking have been discussed as though they were essentially interchangeable. In fact, however, they are not. The nature of banking associated with particular regulatory programs varies depending upon the purposes and policies of those programs. Clarifying some of the key differences among the various types of banking is another of the objectives of this report.

While efforts to mitigate the impacts of various development actions on natural resources have a long history, the practice of habitat banking is of relatively recent vintage. Despite its recent origins, habitat banking, particularly wetland mitigation banking, has grown rapidly. Endangered species conservation banking has an even shorter history, but is also increasingly common. Habitat banking is part of an expanding effort to harness market forces to accomplish environmental goals. Banking has much in common with water quality trading, the marketing of carbon offsets, payments for ecosystem services, and even environmental certification schemes. All recognize that traditional approaches to pursuing environmental goals have not been entirely satisfactory, and all seek to expand the conservation tool box with market-based mechanisms. Helping states understand when and how to use the tool of habitat banking is the primary objective of this report.

Overview and Status of Wetland Mitigation Banking

Wetland mitigation banking has perhaps the longest history of any of the habitat banking programs discussed. Over the past 25 years, the number of and diversity of wetland banks has increased dramatically. Federal, state, and local banking policies have evolved to guide the development of these programs.

Policy overview

Section 404 of the Clean Water Act (CWA) prohibits the discharge of any dredged or fill material in "waters of the United States,"[1] including wetlands, without a permit.[2] The §404 program is carried out by the Corps with oversight by the U.S. Environmental Protection Agency (EPA). Day-to-day permit processing is carried out by the Corps' 38 district offices (see Fig. 1).[3]

Administration of the §404 program is guided by two national goals: (1) the 1972 CWA's purpose, "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters,"[4] "including wetlands";[5] and (2) the national goal, set in 1989, of achieving a "no overall net loss" of wetland acres and functions.[6] The national no net loss policy has been reinforced in subsequent federal wetland compensatory mitigation policy.[7] Because of the difficulty inherent in even measuring, let alone replacing, functions, federal policy suggests that a minimum one-to-one acreage replacement may be used as a reasonable surrogate for no net loss of functions.[8]

The no net loss policy significantly influences how the regulatory agencies make compensatory mitigation decisions. In particular, the agencies may limit the extent to which they allow permittees to rely on preservation as the sole or even primary mechanism for meeting their compensatory mitigation requirements. Thus, the state wildlife action plans' primary focus on the protection of intact, high quality wildlife habitat, rather than the restoration of degraded habitat, may restrict the usefulness of the plans in guiding the siting of wetland mitigation banks. The role of preservation in the wetland compensatory mitigation program is discussed further below (see Chapter 2, "Policy overview").

[1] 33 U.S.C. § 1311; CWA § 301. "'[W]aters of the United States' means (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) All interstate waters including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) Which are used or could be used for industrial purpose by industries in interstate commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section; (6) The territorial seas; (7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section." 33 C.F.R. § 328.3.

[2] 33 U.S.C. § 1344; CWA §404.

[3] Congress created the § 404 program in 1972 with authority divided between the Corps and the EPA. The Corps plays the lead role in the § 404 program through its authority to require and issue permits for the discharge of dredged or fill material into wetlands and other waters. The Corps also conducts or verifies jurisdictional determinations and shares enforcement responsibilities with EPA. 33 C.F.R. § 325.9. EPA is responsible for developing and interpreting the environmental criteria used by the Corps to evaluate permit applications and maintains a review and comment role in the issuance of § 404 permits. EPA is also responsible for determining the geographic scope of jurisdiction and the applicability of exemptions, approving and overseeing state and tribal assumption of the permitting program, and shares enforcement responsibilities with the Corps. 33 U.S.C. § 1344; CWA § 404. Finally, EPA has the authority to veto permit decisions under § 404(c), as well as the authority to elevate permit decisions under § 404(q). 33 U.S.C. §§ 1344 (c), 1344(q); CWA §§ 404(c), (q).

[4] 33 U.S.C. § 1251(a); CWA § 101(a).

[5] U.S. Environmental Protection Agency and U.S. Department of the Army. February 6, 1990. Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines. (Hereinafter Mitigation MOA (1990).)

[6] The national goal of achieving no net loss of wetland acres and functions was first expressed in the report, "Protecting Americas Wetlands: An Action Agenda the Final Report of the National Wetlands Policy Forum." 1988. Washington, DC: The Conservation Fund. The report recommended that "the nation establish a national wetlands protection policy to achieve no overall net loss of the nation's remaining wetlands base, as defined by acreage and function, and to restore and create wetlands, where feasible, to increase the quality and quantity of the nation's wetlands resource base." On June 6, 1989, President H.W. Bush officially articulated no net loss as a national policy goal in a speech to Ducks Unlimited.

[7] Mitigation MOA (1990); U.S. Army Corps of Engineers and US Environmental Protection Agency. December 24, 2002. Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Regulatory Guidance Letter No. 02-2. (Hereinafter RGL 02-2 (2002).)

[8] RGL 02-2 (2002).

Federal Wetland Mitigation Banking Policy

Under §404, compensatory mitigation is required as the third step of a three-step process designed to meet the goals of the CWA and support the national no net loss policy (see Box 1). The basic premise of the §404 permitting program is that no discharge shall be permitted if a practicable alternative exists that is less damaging to the aquatic environment or the discharge would cause the nation's waters to be significantly degraded. In order for a project to be permitted, it must be demonstrated that, to the extent practicable, steps have been taken to avoid impacts to wetlands and other aquatic resources, potential impacts have been minimized, and compensation will be provided for any remaining unavoidable impacts. The three-part mitigation sequence – avoid, minimize, compensate – represents the heart of the agencies' §404 regulatory program.

Significant attention has been paid over the past 20 years to improving the third step in the process - compensation - to ensure that compensatory mitigation efforts are "ecologically self-sustaining,"[9] protected in perpetuity, and ultimately meet the program's no net loss goal. Although technically the term "mitigation" refers to all three steps of the three-part sequencing process, it is often used to describe the third step only.

Satisfying the Third Step: Compensation

Currently, there are three primary mechanisms supported by EPA and the Corps for permittees to meet their compensatory mitigation obligations. These are: performing project-specific or permittee-responsible mitigation, purchasing credits from a mitigation bank, or making a payment to an approved in-lieu fee mitigation sponsor. These last two forms of compensatory mitigation – mitigation banking and in-lieu fee mitigation – are often referred to as "third party" mitigation, since the liability for meeting the compensatory mitigation requirements is transferred to a third party. (For more on in-lieu fee mitigation see Chapter 4, "A Typology of Banks.".)

The Evolution of Wetland Mitigation Banking

Although permittee-responsible mitigation has been and remains the dominant mechanism for meeting compensatory mitigation requirements (approximately 60 percent of all required wetland mitigation nationwide was satisfied by permittee-responsible mitigation in FY 2003),[10] wetland mitigation banking has become increasingly prevalent since its emergence as an alternative in the mid-1980s. The first banks were primarily advanced, consolidated mitigation projects developed to address the future anticipated impacts of public agencies, such as state departments of transportation.

Box 1. Evolution of the Three-Part Mitigation Sequence

In 1980, EPA issued the final §404(b)(1) Guidelines; the regulations that established the environmental criteria by which the Corps evaluates dredge and fill permit applications.(1) One of the central concepts embedded in the Guidelines is that no discharges of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic environment, so long as that alternative does not have other significant adverse environmental consequences.(2) In other words, impacts to aquatic resources must be avoided to the maximum extent practicable. The Guidelines also require that "appropriate and practicable steps" be taken to minimize potential adverse impacts to the aquatic ecosystem before a discharge can be permitted.(3) The Guidelines further describe habitat "development and restoration" as an appropriate method for compensating for permitted impacts that destroy habitat.(4)

In 1990, EPA and the Corps issued a Memorandum of Agreement (Mitigation MOA) to elaborate upon the three-part mitigation requirements of the §404(b)(1) Guidelines.(5) The Mitigation MOA defines mitigation as a three-part sequence – avoidance, minimization, and compensation – each step of which has its origins in the Guidelines.(6)

> The Corps…first makes a determination that potential impacts have been avoided to the maximum extent practicable; remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts and, finally, compensate for aquatic resource values.(7)

Resources: (1) 40 C.F.R. § 230 et. seq.; (2) 40 C.F.R. § 230.10(a); (3) 40 C.F.R. § 230.10(d); (4) 40 C.F.R. § 230.75(d); (5) U.S. Environmental Protection Agency and U.S. Department of the Army. February 6, 1990. Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines; (6) Mitigation MOA (1990), § II.A; (7) Mitigation MOA (1990), § II.C.

[9] RGL 02-2 (2002); From the operational guidelines developed by the National Research Council. See: National Research Council. 2001. Compensating for Wetland Losses Under the Clean Water Act, National Academy of Sciences, p. 5. (Hereinafter NRC (2001).)

[10] Wilkinson, Jessica and Jared Thompson. April 2006. 2005 Status Report on Compensatory Mitigation in the United States. Washington, DC: Environmental Law Institute. (Hereinafter 2005 Status Report (2006).

Banking offered these agencies an option to consolidate their compensation and do so in advance of the anticipated impacts.

The U.S. Fish and Wildlife Service (FWS or Service) first issued guidance on wetland mitigation banking in 1983.[11] Although wetland mitigation banking continued to grow over the following 15 years, existing federal policy on banking did not provide the private sector with enough assurances to encourage a major role in the development of the market.

In the mid-1980s, a series of influential studies were released that questioned the ecological and administrative effectiveness of permittee-responsible mitigation.[12] In light of the findings, wetland mitigation banking gained support as a mechanism that might serve to address the deficiencies of permittee-responsible mitigation. Specifically, wetland banking was viewed as an effective way for compensatory mitigation to be consolidated into larger parcels, thereby allowing for greater financial, administrative, and ecological efficiencies.[13] In response, EPA and the Corps issued interim banking guidance in 1993 and final banking guidance in 1995. [14]

Following issuance of the federal banking guidance in 1995, the number of wetland mitigation banks, particularly those sponsored by the private sector, soared. The guidance gave state agencies, local governments, and the private sector the regulatory certainty and procedural framework they needed to seek approval to operate mitigation banks.[15] (See Chapter 2, "Status – number, distribution, and character of banks.")

Additional federal guidance affecting mitigation banking has been issued in the intervening years,[16] and in March 2006, EPA and the Corps issued a proposed rule on compensatory mitigation that seeks to establish "to an extent that is feasible and practical, equivalent standards for all forms of compensatory mitigation."[17] The final rule may be issued as early as December 2007.

How Wetland Mitigation Banks Work

The 1995 Guidance defines wetland mitigation banks as wetland or stream restoration, creation, enhancement, or preservation projects undertaken to compensate for unavoidable losses to wetlands, streams, and other aquatic resources expressly for the purpose of providing compensatory mitigation in advance of authorized impacts.[18] Banks are created when an entity – generally a private entrepreneur, state or local agency, or nonprofit organization – enters into a formal agreement with a regulatory agency.

The 1995 Banking Guidance established a structure for banking that is characterized by four distinct components:

- The bank site: the physical acreage that has been restored, established, enhanced, or preserved;
- The bank instrument: the formal agreement between the bank sponsor and the regulatory agency(ies) that establishes liability, performance standards, management and monitoring requirements, and the terms of bank credit approval;
- The Mitigation Bank Review Team: the interagency team that provides regulatory review, approval, and oversight of the bank; and
- The service area: the geographic area within which permitted impacts can be compensated at a given bank.[19]

[11] U.S. Fish and Wildlife Service. June 23, 1983. U.S. Fish and Wildlife Service Interim Guidance on Mitigation Banking. ES Instruction Memorandum No. 80.

[12] Eliot, Wendy. 1985. Implementing Mitigation Policies in San Francisco Bay: A Critique. Oakland, CA: California State Coastal Conservancy; Race, Margaret Seluk. 1985. "Critique of Present Wetlands Mitigation Policies in the United States Based on an Analysis of Past Restoration Projects in San Francisco Bay." Environmental Management 9 (1):71-82; Erwin, Kevin L. 1990. "Wetland Evaluation for Restoration and Creation." In Wetland Creation and Restoration: The Status of the Science, edited by J. A. Kusler and M. E. Kentula. Washington, DC: Island Press.

[13] Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, 60 Fed. Reg. 58,605 (1995). § I. B. (Hereinafter Banking Guidance (1995).)

[14] Banking Guidance (1995).

[15] U.S. Environmental Protection Agency. Mitigation Banking Factsheet. http://www.epa.gov/owow/wetlands/facts/fact16.html.

[16] RGL 02-2 (2002).

[17] Compensatory Mitigation for Losses of Aquatic Resources, 71 Fed. Reg. 15,520 (2006) (to be codified at 33 C.F.R. pt. 325 and 332, and 40 C.F.R. pt. 230) (proposed Mar. 28, 2006), p. 15,521. (Hereinafter Proposed Compensatory Mitigation Rule (2006).)

[18] Banking Guidance (1995). §III.

[19] U.S. Environmental Protection Agency. Mitigation Banking Factsheet. http://www.epa.gov/owow/wetlands/facts/fact16.html.

The value of a bank is defined by the number of compensatory mitigation credits available for use or sale. A credit is a "unit of measure representing the accrual or attainment of aquatic functions" at the bank.[20] A bank's instrument identifies the number and type of credits that will likely be available for sale. Before a credit can be sold, however, it must be certified by the Mitigation Bank Review Team. The instrument specifies the method(s) that will be used to certify credits. Credits are generally defined by a functional measure, acres, or some combination thereof.

Mitigation Method

Wetland compensatory mitigation can be accomplished through different means, or "methods": creation, restoration, enhancement, or preservation (see Table 1 for definitions). The agencies recognize that these various compensation methods differ in their ability to replace wetlands acres and functions and, therefore, contribute to the no net loss goal. The agencies address these disparities by favoring wetland restoration over the other compensation methods and using compensation ratios which give more compensation credit to methods that provide greater assurances of replacing lost aquatic resource functions. The rationale the agencies use to evaluate the different mitigation methods are outlined in Table 1.

Existing policy states that preservation of wetland acres may generate compensation credits if it is used in conjunction with the other compensation methods or when it will "augment the functions of the restored, created or enhanced aquatic resource."[21] The federal wetland agencies generally only support the use of preservation as the sole method of compensation in "exceptional circumstances."[22] In the eyes of the regulatory agencies, preserving wetland acreage, even high quality wetland acreage, as compensation for permitted impacts to wetland habitat leads to a net loss of wetland acres and functions.

Most compensatory mitigation projects include a mix of mitigation methods. A project may restore a degraded wetland, preserve existing wetland acreage, and enhance the functions of an existing wetland all within the boundaries of a single compensatory mitigation project. However, on a cumulative basis, the Corps strives to meet the no net loss goal and therefore discourages preservation as the sole form of compensation in a given project.[23]

In 2002, the Corps released guidance to the field reiterating these views.[24] The 2006 proposed compensatory mitigation rule indicated that the definition of compensatory mitigation might be changed to include the preservation of aquatic resources in "certain circumstances;"[25] presumably leading to greater leeway in utilizing preservation than the current policy, which emphasizes the use of preservation only in "exceptional circumstances." It remains to be seen whether this definition will stand when the mitigation regulations are finalized.

Ratios are the second approach the agencies use to address the different contributions the four compensation methods make toward meeting the no net loss goal. The Corps takes compensation method into account when determining how much compensatory mitigation credit to assign to a project. For example, since restoration contributes to a net gain in wetland functions and/or acres, permittees generally are

[20] Banking Guidance (1995), § III. F.

[21] Banking Guidance (1995), § II.B.4.

[22] Banking Guidance (1995), § II.B.4. "…the preservation of existing wetlands and/or other aquatic resources in perpetuity may be authorized as the sole basis for generating credits in mitigation banks only in exceptional circumstances…" In addition, "Determining whether preservation is appropriate as the sole basis for generating credits at a mitigation bank requires careful judgment regarding…whether wetlands and/or other aquatic resources proposed for preservation (1) perform physical or biological functions, the preservation of which is important to the region in which the aquatic resources are located, and (2) are under demonstrable threat of loss or substantial degradation due to human activities that might not otherwise be expected to be restricted. The existence of a demonstrable threat will be based on clear evidence of destructive land use changes which are consistent with local and regional land use trends and are not the consequence of actions under the control of the bank sponsor."

[23] RGL-02-2 (2002), § 2.c. "There may be instances where permit decisions do not meet the "no overall net loss of wetlands" goal because compensatory mitigation would be impracticable, or would only achieve inconsequential reductions in impacts. Consequently, the "no overall net loss of wetlands goal" may not be achieved for each and every permit action, although all Districts will strive to achieve this goal on a cumulative basis, and the Corps will achieve the goal programmatically."

[24] RGL 02-2 (2002), § 2.f.

[25] Proposed Compensatory Mitigation Rule (2006), § 332.2.

Table 1. Mitigation Methods

Mitigation method	Definition, policy, and relationship to no net loss policy
Creation (Establishment)	Definition: The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site where a wetland did not previously exist. Policy: Because of the difficulty in establishing wetland hydrology, should be used only with adequate assurances of success. No net loss role: Results in a gain in wetland acres and functions.
Restoration	Definition: The manipulation of the physical, chemical, or biological characteristics of a site, with the goal of returning natural or historic functions to a former wetland. Policy: Should be the first option considered when siting a bank. No net loss role: Results in a gain in wetland functions. May or may not result in a gain in wetland acres.
Enhancement	Definition: The manipulation of the physical, chemical, or biological characteristics of a wetland (undisturbed or degraded) site to heighten, intensify, or improve a specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes, such as water quality improvement, flood water retention, or wildlife habitat. Policy: Because of the tradeoff in wetland functions involved with certain enhancement activities, should be used only with adequate assurances of overall environmental benefit. No net loss role: Does not result in a gain in wetland acres. Results in a gain in some wetland functions, but may result in a loss of others.
Preservation (Protection/ Maintenance)	Definition: The removal of a threat to, or preventing the decline of, wetland conditions by an action in or near a wetland. This term includes the purchase of land or easements, repairing water-control structures or fences, or structural protection such as repairing a barrier island. Policy: Should be used as the sole basis for generating credits "only in exceptional circumstances." No net loss role: Does not result in a gain in wetland acres or functions.

Definitions from RGL 02-2 (2002). Policy from Banking Guidance (1995), §II. B. 3-4.

allowed to compensate one acre of wetland loss with one acre of wetland restoration. Because wetland preservation is not viewed as contributing to the overall no net loss goal, permittees may be required to offset one acre of wetland loss with five, ten, or more preserved acres. Regardless of the ratio, preservation alone never accomplishes the no net loss goal. As a result, when preservation is one of the methods used in a given project, the Corps may require that it be used in conjunction with other mitigation methods that do replace the lost acres and functions.

Corps District Wetland Mitigation Banking Policy

Although §404 of the CWA provides the Secretary of the Army with the authority to issue or deny permits, the responsibility for doing so has been delegated to the Chief of Engineers.[26] Because the Corps is "a highly decentralized organization," most of the authority for administering the regulatory program has, in

[26] 33 CFR Part 323.6 (a). U.S. Army Corps of Engineers. "Regulatory Program: Overview." http://www.usace.army.mil/cw/cecwo/reg/oceover.htm.

turn, been delegated to the agency's 38 district offices (see Fig. 1).[27]

The Corps' direction on administering the §404 program derives from the Department of the Army regulations (33 CFR 320-331). The regulations have evolved over time to reflect new authorities and developing case law. The regulations are supplemented by the federal guidance issued by the Corps and interagency guidance issued in conjunction with the other sister wetland agencies. In addition, individual Corps districts issue their own guidance on the program, including guidance specifically pertaining to wetland mitigation banking. In many instances, the district-specific guidance is modeled after national guidance and is developed in response to a request from Headquarters.

At least 32 of the Corps' 38 districts have issued general guidance or standard operating procedures on compensatory mitigation. Seventeen districts have issued guidance specifically on mitigation banking and 10 of these have issued the mitigation banking guidance in conjunction with other federal and/or state agencies (see Appendix B for a bibliography of Corps district banking guidance).

State Wetland Mitigation Banking Policy

Many states in the U.S. have wetland programs with regulatory provisions that complement the §404 program. Some of these programs create additional regulatory requirements over and above §404 and some have wetland regulatory thresholds that are more stringent than §404. Thus, these programs often require mitigation for impacts not covered by §404. A comprehensive survey of state wetland programs completed in 2007 found that at least 20 states have statutes authorizing state wetland mitigation banking programs or authorizing the state to purchase credits from a wetland mitigation bank; at least 16 states have wetland mitigation banking regulations; and at least 18 states have developed guidance on wetland mitigation banking, often in coordination with the Corps or a Mitigation Bank Review Team (MBRT) (see Appendix C for chart and Appendix E for narrative descriptions).

[27] 33 CFR Part 320.1 (a) (1).

FIGURE 1. U.S. Army Corps of Engineers – Division and District Boundaries

A review of these laws, regulations, and policies along with interviews with state wetland program staff reveal that at least eleven states (Arkansas, California, Florida, Michigan, Minnesota, New Jersey, North Carolina, Oregon, Virginia, Washington, and Wisconsin) have active wetland mitigation banking programs. In addition to having laws, regulations, or policies that address wetland mitigation banking, these states support banking through programmatic commitments of staff and funding.

The ways in which these state wetland laws, regulations, and policies interact with the federal wetland mitigation banking process varies from state to state. Three states with active banking programs – Florida, Michigan, and Oregon – are discussed below to provide examples of how state and federal wetlands programs interact to affect mitigation banking on the ground.

Wetland Mitigation Banking in Florida

Florida has one of the nation's oldest and best developed state wetland regulatory programs. The state legislature approved mitigation banking legislation.[28] The Florida Department of Environmental Protection (DEP) Florida and the Florida water management districts (WMD) promulgated rules governing banking in February 1994.[29] Mitigation banks in Florida must obtain a mitigation banking instrument approved by the federal interagency Mitigation Bank Review Team that operates in Florida and a state bank permit approved by DEP or the appropriate WMD. In 1998, the Florida MBRT[30] developed joint state/federal guidelines to provide direction to the MBRT review process and "streamline the respective evaluation processes and reduce redundancy between the State and Federal reviews."[31] The state's MBRT is co-chaired by the Corps and the lead state agency (either FL DEP or a WMD). Approval of banks begins as a joint federal/state review, but state and federal approval processes may diverge as the proposal moves forward due to different requirements. However, the state and federal MBRTs continue to coordinate throughout. As of 2005, Florida had 55 approved, pending, or sold-out banks. A pending bank is one with a completed draft banking instrument or prospectus, but for which the Corps has not yet approved the banking instrument. A sold-out bank is one that was approved and subsequently sold all of the available credits (i.e., the bank has been completely debited).

Wetland Mitigation Banking in Michigan

Michigan is only one of two states (the other being New Jersey) that has assumed administration of the §404 program, as allowed under the CWA. In order to assume the program, Michigan was required to develop a wetlands permit program similar to the federal program and submit an application to assume the program to EPA.[32] Michigan assumed §404 in 1984. Under the state's wetlands law, mitigation is required as a condition of many permits.[33] Administrative rules for mitigation banking were promulgated in 1997.[34] In order to establish a bank in the state, the bank sponsor must enter into a Wetland Mitigation Banking Agreement with the Michigan Department of Environmental Quality (DEQ). In 2001, DEQ issued a Wetland Mitigation Banking Handbook[35] outlining the process for establishing a bank, planning considerations, and bank management. DEQ is required by state regulations to maintain a registry of established

[28] FL. STAT. ANN. § 373.4135 and 373.4136. Fla. Stat. ch. 373.4135-.4137, ch. 373.414, ch. 403.9322. See: Reiss, Kelly Chinners, Erica Hernandez, Mark T. Brown. May 2007. "An Evaluation of the Effectiveness of Mitigation Banking in Florida: Ecological Success and Compliance with Permit Criteria." Florida Department of Environmental Protection. http://www.dep.state.fl.us/water/wetlands/docs/mitigation/Final_Report.pdf.

[29] Florida Mitigation Bank Review Team. October 1998. "Joint State/Federal Mitigation Bank Review Team Process for Florida." http://www.saj.usace.army.mil/regulatory/permitting/mitigation/mBanks.htm.

[30] Comprised of FL DEP, water management districts, Corps, EPA, NMFS, FWS, and NRCS.

[31] Florida Mitigation Bank Review Team. October 1998. "Joint State/Federal Mitigation Bank Review Team Process for Florida." http://www.saj.usace.army.mil/regulatory/permitting/mitigation/mBanks.htm.

[32] Clean Water Act, Section 404 Program Definition and Permit Exemptions; Section 404 State Program Regulations, June 6, 1988, Federal Register, 40 CFR Parts 232 and 233.

[33] Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

[34] 12 Mich. Admin. Code R. §§281.951-.961.

[35] Michigan Department of Environmental Quality. September 2001. "MDEQ Wetland Mitigation Banking Handbook." See: http://www.deq.state.mi.us/documents/deq-water-wetlands-webhandbook.pdf.

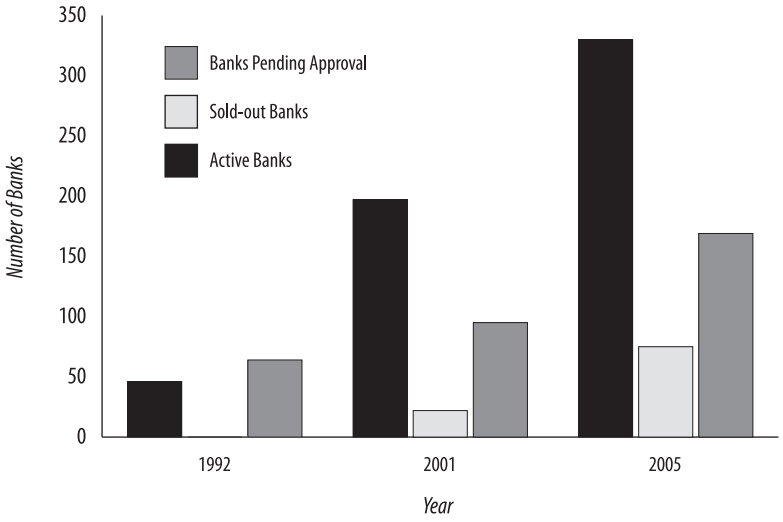


***FIGURE 2. Mitigation Banking Trends:** The number of mitigation banks in the United States that were active, sold-out, or pending approval in 1992, 2001, and 2005*

wetland mitigation banks and approved mitigation credits.[36] As of 2005, Michigan DEQ had approved three wetland mitigation banks and two umbrella banking agreements.[37]

Wetland Mitigation Banking in Washington State

In 1998, the Washington State legislature passed a wetland mitigation banking statute directing the Washington State Department of Ecology (Ecology) to develop a mitigation bank certification program.[38] Ecology established an 18-member advisory group to develop regulations to implement the statute. A proposed rule was published in 2001, but was withdrawn due to funding shortfalls. The draft rule included many of the same requirements as the federal program, although it would allow local jurisdictions to co-chair MBRTs and veto certification if they do not concur with Ecology's certification.[39] The statute is currently implemented through a pilot program that was authorized in 2004.[40] Washington currently has four approved banks, four banks pending approval, one approved and active umbrella banking agreement, and three pending umbrella banking agreements.[41]

Status – number, distribution, and character of banks

In 1992, ELI documented 46 approved mitigation banks in the country and 64 proposed banks (see Fig. 2). The approved banks could be found in 18 states (see Fig. 3). At the time, only two states – California and Florida – had more than five approved banks.[42] In 2001, ELI documented 219 approved mitigation banks in the country. Of these, 197 were active and 22 were sold-out (see Fig. 2).[43] These banks could be found in 29 states (see Fig. 3), 12 of which had more than 5 approved banks. At the time, there were also 95 banks pending approval by the Corps.[44] The total number of approved banks represented a 376 percent increase over the number of banks identified in 1992.

By September 2005, the Corps districts reported that there were 405 approved mitigation banks in the country. Of these approved banks, 330 were active and 75 were sold-out (see Fig. 2). This represented an 85 percent increase in the number of approved banks in four years and a 780 percent increase in the number of banks in fourteen years. In 2005, there were approved banks in 31 states and 18 states had more than 5 banks. The districts also reported an additional 169 banks pending approval (see Fig. 3).

[36] 12 Mich. Admin. Code R. §281.958.

[37] 2005 Status Report (2006).

[38] Wash. Rev. Code Ann. §§90.84.005 - .070, 47.12.330 - .360.

[39] Thomas, Roxanne. 2005. State Wetland Program Evaluation: Phase I. Washington, DC: Environmental Law Institute.

[40] Department of Ecology. "Wetland Mitigation Banking." http://www.ecy.wa.gov/programs/sea/wetlands/mitigation/banking/index.html.

[41] 2005 Status Report (2006).

[42] Environmental Law Institute. Wetland Mitigation Banking. Washington, D.C.: Environmental Law Institute, 1993. Appendix A.

[43] Environmental Law Institute. 2002. Banks and Fees: The Status of Off-Site Wetland Mitigation in the United States. Washington, D.C.: Environmental Law Institute. p. 35. (Hereinafter Banks and Fees (2002).)

[44] Banks and Fees (2002).

The number of approved (active or sold-out) mitigation banks in each state in 1992.

The number of approved (active or sold-out) mitigation banks in each state in 2001.

The number of approved (active or sold-out) mitigation banks in each state in 2005.

***FIGURE 3. Geographic Trends in Mitigation Banking:** The number of approved (active or sold-out) mitigation banks in each state in 1992, 2001, 2005.*

Overview and Status of Conservation Banking

Policy Overview

"Conservation banking" is the term typically used to refer to the practice of restoring, enhancing, or preserving non-wetland habitats, or habitats for rare species, in anticipation and fulfillment of expected future obligations to compensate for detrimental impacts to such habitats or species. In short, it is "mitigation banking" carried out under another name and under legal authority other than the CWA. The name "conservation banking" may have been chosen over "mitigation banking" as a means of avoiding some of the controversy associated with wetlands mitigation banking. More significant than the difference in names, however, are noteworthy differences in history, experience, and policy.

Unlike wetland mitigation banking, conservation banking traces its origins to a state-level initiative. In 1995, the State of California promulgated a formal policy on conservation banking, aimed at encouraging anticipatory conservation efforts on behalf of not only rare species, but also rare habitats. The California policy, still in effect today, was the first formal policy on the topic from any jurisdiction, state or federal. Facilitated by that policy, conservation banking has gained a prominence in California unmatched anywhere else. Although conservation banks can now be found in many other states, the majority of them are found in California.

At the federal level, the Service has allowed credits from state-fostered conservation banks to be used to meet regulatory requirements of the federal Endangered Species Act[45] since the mid-1990s. Nevertheless, there was no national-level federal policy or guidance on the establishment and use of conservation banks under the ESA until 2003. The 2003 policy, like the California policy, is less detailed and more flexible than the federal policy that governs the establishment and use of wetland mitigation banks. As will be described in more detail below, the actual experience with conservation banking has also been considerably different from the experience with wetland mitigation banking. In part, those differences reflect differences in the underlying policies and orientations of the laws that give rise to the two different forms of banking.

Federal Habitat Banking Policy[46]

In contrast to the experience with federal wetland mitigation banking policy, federal policy pertaining to endangered species conservation banking is quite recent and still relatively informal. Although the Service was allowing the use of credits from various conservation banks to serve as mitigation for authorized impacts to endangered species as long ago as the mid-1990's, it was not until 2003 that the Service published national level guidance for the establishment, use, and operation of conservation banks to satisfy mitigation requirements under the federal ESA.[47]

The Service's guidance seeks to promote conservation banking by providing consistency in the establishment and use of banks, as well as transparency to landowners and developers regarding the rules of the banking process. It applies to banks established on private, tribal, state, or local lands, and neither covers nor precludes conservation banks on Federal lands. Below, we discuss several of its key provisions that are intended to ensure that banks provide long-term conservation benefits for the species they cover and to provide opportunities for economic payoff for their owners.

<u>Banks must meet the conservation needs of one or more listed species</u>

Under the guidance, the goal of conserving listed species sets the standard against which the Service

[45] Those regulatory requirements include the requirement to mitigate the impact of the "incidental" taking of listed wildlife when authorized pursuant to §10, as well as the requirements for federal agencies to avoid jeopardy to and minimize the incidental taking of listed species pursuant to §7. While the §7 requirements are not explicitly framed in terms of "mitigation," in practical effect that is what they entail. The authorization of incidental taking pursuant to §10 requires the preparation of a "habitat conservation plan" or "HCP." In effect, an HCP is a plan that describes both the activities (typically development activities) expected to result in the incidental taking of protected species and the measures to be implemented to offset the impacts of that taking.

[46] This section of the report is adapted from Bauer, Marybeth, Jessica Fox, and Michael J. Bean. August 2004. "Landowners Bank on Conservation: The U.S. Fish and Wildlife Service's Guidance on Conservation Banking", 34 Environmental Law Reporter 10717.

[47] U.S. Fish and Wildlife Service. May 2, 2003. "Guidance for the Establishment, Use, and Operation of Conservation Banks". http://endangered.fws.gov/policies/conservation-banking.pdf. (Hereinafter Guidance on Conservation Banks (2003).)

decides whether to approve conservation banks. Approval of a bank amounts to a judgment that the bank's contribution to the conservation of the covered species will be sufficient to offset authorized adverse impacts to that species in the bank's service area. The Service is to evaluate proposed banks in relation to a scientifically sound conservation strategy (such as a recovery plan, when available) for the species covered by the bank and assess whether the bank furthers that strategy. The bank site and its management program are "paramount" considerations for such an assessment.[48] In particular, since most listed species are threatened by habitat loss and fragmentation, the guidance recommends siting banks in large, unfragmented regions of habitat adjacent to areas already managed to benefit the covered species, or in areas that serve as corridors. Non-restorable areas should be excluded from bank boundaries. Moreover, since most listed species and their habitat cannot be conserved without active management such as invasive species control, the guidance requires that all banks implement an active management program. The primary goal of bank management programs is to maintain habitat for continued use by the covered species.

The service area of a bank should meet the conservation needs of the species

In addition to setting the standard for bank approval, the goal of species conservation provides the basis for designating the service areas of banks.[49] The guidance advises that banks be located within areas designated by recovery plans as "recovery units" or other recovery focal areas. Commonly, recovery plans set specific goals for each recovery unit, such as some quantity of protected habitat or some population goal for the species. A bank's service area is to correspond to the recovery area in which the bank is located. In this manner, banks can help achieve the recovery goals for the particular recovery unit in which they occur. If there is no recovery plan for the species, the bank location and service area should be based on similar considerations. Prior banking practice did not always confine credit sales to the designated service area or limit service areas to the recovery unit in which the bank is located.

Credits are awarded for conservation outcomes rather than management actions

The goal of meeting the conservation needs of the covered species also serves as the criterion for the Service's issuance of credits to banks. Under the Service's guidance, "species or habitat conservation value outcomes (e.g., numbers of nesting pairs and family groups, or enhanced or created habitat), not the implementation of actions that are causal to those outcomes and values, are the standards by which the Service will evaluate banks and authorize issuance and sale of mitigation credits."[50] In other words, issuance of credits is conditional upon the success of the bank's management program in meeting the conservation needs of the covered species rather than the banker's implementation of that program.

While outcome-based evaluation safeguards the conservation value of banks, it was not standard practice prior to the federal guidance. Rather, it has been common practice for bank owners to receive credits upon conveyance of a conservation easement over the bank site – independently of the success of subsequent management actions. For example, the Hickory Pass Ranch Conservation Bank in Texas earned credits as soon as a conservation easement was placed on bank lands, without regard to whether the subsequent management measures required to sustain the high quality habitat of the bank actually maintained the population of endangered golden-cheeked warblers there. Whereas this practice assumes that bank owners will generate and successfully implement a management plan that supports the long-term needs of the species, the guidance requires conservation outcomes as a condition of credit release.

The conservation commitment made by a landowner when establishing a bank is permanent

Under the guidance, conservation banks may employ a variety of conservation strategies, including "preservation, management, and restoration of degraded habitat, connecting of separated habitats, buffering of already protected areas, creation of habitat, and other appropriate actions."[51] Regardless of the strategy, bank owners must commit to manage the natural resource values

[48] Guidance on Conservation Banks (2003), § II.B.3.

[49] Guidance on Conservation Banks (2003), § II.C.2.

[50] Guidance on Conservation Banks (2003), § II.D.1.

[51] Guidance on Conservation Banks (2003), § II.B.7.

of their banks in perpetuity. To effect such a commitment, an owner must convey a permanent conservation easement over the bank property and provide adequate funding for the perpetual management and monitoring of the property. The guidance recommends that bank owners establish a non-wasting endowment fund by depositing a fixed amount for every credit sold.[52]

A "conservation banking agreement" must be prepared for every bank and include a management plan that provides assurance of long-term funding, as well as provisions for remedial action

A written banking agreement between the conservation bank owner and the Service is to be prepared for every bank. The guidance lists the required content for conservation banking agreements, providing a national standard for documenting the establishment and operation of conservation banks.[53] Among the requirements is a management plan. The management plan is to identify the management actions necessary to achieve the conservation goals of the bank and provide assurance of long-term funding to manage the bank in perpetuity via an endowment fund. A designated bank manager is responsible for implementing the management plan. Conservation banking agreements must include provisions for remedial action in the event that the bank owner or manager fails to meet obligations specified in the banking agreement.

Consistent with past banking practice, the guidance does not require that a management plan be approved by the Service before credits become available for sale. For example, one approved conservation bank was not required to submit a management plan until six months after the effective date of the banking agreement, when twenty-five percent of the total credits became available. Moreover, for some banks in California, the Service has allowed the sale and use of credits in anticipation of signing a banking agreement. This latter practice appears to now be precluded by the guidance.

State Habitat Banking Policy

As noted above, the State of California became the first state to adopt a formal policy on conservation banking in 1995. That California was the first jurisdiction to do so reflected the confluence of several important factors unique to the state. Those included at least two significant environmental laws of general application that imposed potentially stringent regulatory restrictions on a wide range of development activities. Second, an active and vocal environmental constituency ensured that those laws would be enforced. Third, relentless development pressure in one of the nation's fastest growing states created a steady demand for practical mitigation options. And finally, the state's development community had a history of creativity and openness to new ideas that enabled it to recognize and embrace the potential benefits of conservation banking.

Although "conservation banking" is often used almost synonymously with "endangered species banking," it is noteworthy that in California, where it began, conservation banking has always had a broader meaning. That is because conservation banking there is a means of meeting mitigation requirements imposed not only under the California Endangered Species Act, but also those imposed under the California Environmental Quality Act (CEQA) and the California Coastal Act. CEQA is California's counterpart to the National Environmental Policy Act (NEPA). However, NEPA is a purely procedural statute, imposing on federal agencies a duty to disclose and assess the environmental impacts of major federal actions, while CEQA imposes both procedural and substantive duties. In addition to disclosing and assessing environmental impacts, CEQA requires that those impacts be mitigated. Thus, a project subject to CEQA that adversely affects an environmentally important type of habitat (e.g., native riparian forest) may be required to mitigate that impact, whether or not an endangered species is also affected.

The California policy identifies four types of resource management activities that can generate credits at a bank. Significantly, the first of these is preservation of an existing resource (in contrast to longstanding federal wetland mitigation banking policy, which allows preservation of existing wetlands to generate credits only under "exceptional circumstances"). Credits can also be earned from resource restoration, enhancement, or creation. In practice, most of the banks developed thus far under California's policy can be fairly characterized as "preservation banks."

[52] Guidance on Conservation Banks (2003), § II.D.4.

[53] Guidance on Conservation Banks (2003), § II.E.1.

The California banking policy allows the recognition and use of at least some credits from an approved bank before "the full realization of the targeted resource value at the bank." In practice, however, since most of the California banks approved thus far are preservation banks, the opportunity to use or sell credits before the banks have been firmly established has generally been of little consequence. Indeed, the policy requires that upon the sale of the first credit from a bank (or from a designated "subarea" of a bank), the entire bank site (or subarea) must be permanently protected through fee title or a conservation easement.

Because most banks developed thus far under the California policy have been preservation banks, the silence of the California policy on the question of whether restoration, creation, or enhancement activities on publicly owned land can generate credits has not been a major concern. The California policy was also initially silent on the question whether banks would be required to provide in-kind replacement for the resources affected by a development activity, or whether impacts to a particular type of resource could be offset by conservation actions taken on behalf of a different, more imperiled resource. In 1996, however, the California Department of Fish and Game jointly issued with the U.S. Fish and Wildlife Service (which had no official policy of its own at the time) a "Supplemental Policy Regarding Conservation Banks Within the Natural Community Conservation Planning (NCCP) Area of Southern California." That Supplemental Policy provides that in-kind mitigation, involving the same habitat types or species, is generally required, subject to a very limited exception.

The State of Washington offers an example of a state's efforts to develop policy on conservation banking by first gaining practical experience with banks. The Washington Wildlife and Recreation Program (WWRP) was established by citizen initiative in 1989 to provide funding for local parks, natural areas, farmland preservation, and a number of other similar purposes. Funds are appropriated for the WWRP by the state legislature. The legislation establishing the WWRP declares a state policy "to acquire as soon as possible the most significant lands for wildlife conservation … purposes before they are converted to other uses.[54]

The WWRP is administered by a Recreation and Conservation Funding Board (known until recently as the Interagency Committee for Outdoor Recreation), which consists of five citizens appointed by the Governor, the Director of the Department of Fish and Game, the Director of the State Parks and Recreation Commission, and the Commissioner of Public Lands.

In 2005, the Washington legislature amended the WWRP governing statute to allow the Board to fund mitigation bank projects. Pursuant to this authority, in March 2006 the Board (then known as the Interagency Committee) published a request for mitigation banking proposals, with the stated aim of funding three to six initial projects. One of the expressly stated goals of this initiative, which the Board characterized as a pilot effort, was to "make a positive contribution to the evolution of mitigation banking policy and practice in Washington State." It should be noted that the habitat banking Washington sought to stimulate was unlike most banking elsewhere, in that it was to be publicly financed, at least at the outset.

The Board's Request for Proposals (RFP) contains an interesting and useful discussion of mitigation and conservation banking. After noting the restoration focus typical of wetland mitigation banks and the preservation focus typical of conservation banks, the RFP stated that the "emphasis on preservation of high quality habitat and listed species in the WWRP suggests that the 'conservation bank' approach would be appropriate for mitigation banking projects funded by WWRP." However, the RFP went on to note that "very little policy development for conservation banking has been done in Washington State." In particular, the RFP stated that "[g]iven the lack of state policy guidance for mitigation banking beyond wetlands, a complementary goal of this pilot program is to stimulate creative approaches to establishing banks that are capable of compensating for negative impacts to a variety of habitats and species."

The RFP set forth a number of requirements for responsive proposals, including a "plan for bank credits that specifies how [the applicant] will work with the appropriate regulatory agencies to value the gains in species and habitat benefits (or credits), what regulatory framework will accept or recognize the credits, who will be eligible to purchase credits, and how/by

[54] Revised Code of Washington, Section 79A.15.005.

whom the credits will be managed." Answering such questions is often the most complex challenge facing any conservation banking proposal and typically takes considerable time to resolve. However, the RFP required that proposals be submitted less than two months after it was issued.

In the end, the results were more modest than the RFP appeared to hope.[55] Only two banking projects were funded. One was a fairly standard wetland mitigation bank to restore "about 60 acres of low-quality wetlands." The other was somewhat ambiguously described as a "conservation mitigation bank" that includes restoration of riparian, wetland, and oak woodland habitat, with the credits initially to be used for mitigation of construction projects by the City of Camas. Whether these projects will contribute to the evolution of mitigation banking policy and practice in Washington that the WWRP RFP sought remains to be seen. WWRP itself is mentioned only briefly in the Washington wildlife action plan, among a list of state and federal land acquisition programs. The action plan does not mention banking at all.

Status – number, distribution, and character of banks

Information on the number, location, and nature of conservation banks in the United States is not easily accessible. The Service, for example, does not maintain a publicly accessible, nationwide database of banks approved pursuant to the Endangered Species Act. That information is apparently maintained only in individual field offices, only a very few of which have posted it on the internet. The Service's Sacramento Field Office, which has been the epicenter of conservation banking for the Service, provides basic information on twenty-five active banks within its jurisdiction on its web site.[56] California Department of Fish and Game, the state agency with the most extensive conservation banking experience, does maintain an internet-accessible database of its approved banks, though the information in that database is limited and it is uncertain if the information is current.[57]

At least two major studies have tried to compile reasonably comprehensive information about conservation banks in recent years. In late 2003, a private consulting firm, Stratus Consulting Inc., prepared "A Nationwide Survey of Conservation Banks" for NOAA Fisheries. [58] That survey identified 48 active conservation banks and presented quite detailed information about 22 of these, including date of establishment, location, size, types of credits available from the bank, the bank owner, type of management on the bank property, number of credits available, and even, in some cases, a history of credit transactions. At least for the 22 banks it examined in detail, this study is the most detailed of any done to date.

Two years later, Fox and Nino-Murcia published their study, "Status of Species Conservation Banking in the United States."[59] They concluded that as of December 2003 (the same month as the Stratus Consulting report), there were 76 properties in the U.S. that had been identified as conservation banks, but only 35 of these had been established pursuant to a conservation banking agreement approved by the U.S. Fish and Wildlife Service. These they called "official conservation banks." Interestingly, ten, or nearly half, of the 22 banks that Stratus Consulting had examined in detail were not included among the "official conservation banks" recognized by Fox and Nino-Murcia. Thirty of the 35 official banks were in California.

[55] Brief descriptions of the WWRP projects funded in 2007 can be found at www.iac.wa.gov/documents/Press_Releases/wwwrp_alea_lwcf_bfp-state_funding.pdf.

[56] See: http://www.fws.gov/sacramento/es/bank_list.htm.

[57] See: http://www.dfg.ca.gov/hcpb/conplan/mitbank/catalogue/catalogue.shtml.

[58] The Survey is available at: www.stnmfs.gov/st5/documents/Stratus%20Consulting_Conservation%20Banking_Final.pdf.

[59] Fox, Jessica and Anamaria Nino-Murcia. August 2005. "Status of Species Conservation in the United States." Conservation Biology Vol. 19, No. 4: 996-1007.

3. State Wildlife Action Plans

The following section is designed to give the reader a fuller understanding of the key elements that characterize the state wildlife action plans. The main focus, however, is on the degree to which the plans contemplate the use of banking to meet their conservation objectives. It also describes some of the variability among plans and how they are currently being employed at a variety of levels to support banking.

Overview & Status

In 2000, Congress passed the Conservation and Reinvestment Act in order to address a long-standing gap in funding for the 90 percent of wildlife species that are neither hunted nor fished.[60] The Act created the State Wildlife Grants Program, which provides federal funding to every state for conservation efforts that prevent wildlife from becoming endangered. In order to be eligible for this new funding source, the states were required to develop a statewide wildlife action plan – a proactive, comprehensive strategy for conserving wildlife before they become more rare and more costly to protect.

All 50 states and 6 territories submitted final plans to the U.S. Fish and Wildlife Service on or before October 1, 2005. The plans identify species in greatest need of conservation in each state and include: information on the distribution and abundance of wildlife species; descriptions of locations and relative condition of key habitats and community types essential to species conservation; descriptions of problems which may adversely affect species or their habitats; and descriptions of priority conservation actions that can conserve species and habitats.

From 2001 (the first year the program provided funding to the states) through 2007, the State Wildlife Grants Program has provided the states with over $427 million for the conservation of at-risk species. In contrast, during the same period state wildlife agencies received over $3.5 billion for the protection and management of sport fish and hunted wildlife species.[61] Although the State Wildlife Grants Program provides wildlife agencies with much needed funding for the conservation of non-game species, a stable, reliable, and larger source of funding is needed if the tide of species loss is to be stemmed.[62]

Although each state's plan was required to address eight specific elements (see Box 2), their approaches varied widely. For example, a review of all 50 state and 3 territorial plans reveals that only 31 plans included maps of habitat distribution and only 22 included maps showing focal areas (clearly defined geographic units that represent the combination of threat, opportunity, and ecological significance).[63]

What State Wildlife Action Plans Say About Wetland and Conservation Banking

In considering how habitat banking might be used to further the conservation goals of state wildlife action plans, it is instructive to begin by examining what the plans themselves actually say about this subject. All of the plans that are available in electronic format were examined to identify references to habitat banking or closely related topics.

Our inquiry revealed that the great majority of plans say nothing at all about banking. Indeed, only eleven plans (CA, CO, CT, FL, GA, IA, MD, NM, NC, OR, and SC) make any reference to habitat banking, and in five of these (CA, CT, GA, IA, and MD) the only reference to banking is relegated to the appendices rather than the main body of the plan. Four plans (FL, IA, MD, and NC) make but a single brief reference to banking. These results were somewhat surprising in that there are a number of states with active banking programs and a significant number of established banks that make no mention of banking in their plans. For example, Ohio, New Jersey, and Virginia

[60] Association of Fish and Wildlife Agencies and U.S. Fish and Wildlife Service. 2006. State Wildlife Grants: Five-Year Accomplishment Report.

[61] $1.5 billion through the Federal Aid in Wildlife Restoration program and $2.0 billion through the Federal Aid in Sport Fish Restoration program. See: http://federalaid.fws.gov/wr/WR%20Apportionment%20History%20Thru%202007.pdf and http://federalaid.fws.gov/sfr/SFR%20Apportionment%20History%20Thru%202007.pdf. For more information on the Federal Aid in Wildlife Restoration and Federal Aid in Sport Fish Restoration programs see: http://federalaid.fws.gov/.

[62] Association of Fish and Wildlife Agencies and U.S. Fish and Wildlife Service. 2006. State Wildlife Grants: Five-Year Accomplishment Report.

[63] Defenders of Wildlife. March 2006. Conservation Across the Landscape: A Review of the State Wildlife Action Plans. pp.10, 14.

Box 2. State Wildlife Action Plans: Eight Required Elements

Congress identified eight required elements to be addressed in each state's wildlife action plan (technically called a "comprehensive wildlife conservation strategy"). Congress also directed that the plans must identify and be focused on the species in greatest need of conservation yet address the full array of wildlife and wildlife-related issues.

1. **Information on the distribution and abundance of species of wildlife,** including low and declining populations as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife – termed "species of greatest conservation need";
2. **Descriptions of the extent and condition of habitats and community types** essential to conservation of species of greatest conservation need;
3. **Descriptions of problems** that may adversely affect the species or their habitats, **and priority research and survey efforts** needed to identify factors that may assist in the restoration and conservation of these species and habitats;
4. **Descriptions of the proposed conservation actions** for conserving the identified species and habitats and priorities for implementing such actions;
5. **Proposed plans for monitoring** the species and their habitats, monitoring the effectiveness of the conservation actions, and adapting these conservation actions to respond appropriately to new information or changing conditions;
6. **Descriptions of procedures to review the plan** at intervals not to exceed ten years;
7. Plans for **coordinating the development, implementation, review, and revision of the plan with federal, state, and local agencies and Indian tribes** that manage significant areas of land and water within the state or administer programs that significantly affect the conservation of identified species and habitats; and
8. Plans for **broad public participation** as an essential element of developing and implementing these plans, carrying out conservation projects during the development of these plans, and conserving the species in greatest need of conservation.

Adapted from: Teaming With Wildlife. "State Wildlife Action Plans: Eight Required Elements." http://www.wildlifeactionplans.org/pdfs/eight_elements_handout.pdf

(among others), all have active banking programs and many active or pending banks (at least 47 in Virginia alone), but none of their plans even mention banking. California was another surprising example. Its formal conservation banking policy in 1995 has fostered the development of a thriving conservation banking industry, including wetland mitigation banks and endangered species conservation banks, among others. Yet, the California plan makes only passing references to banking in its appendices.

The Oregon Plan is alone in providing an extensive discussion of banking. Among other things, the chapter summarizing the state's overall strategy recommends that the State "[e]xpand conservation banking to a statewide approach." In explaining this recommendation, the plan states that "Conservation banks could be expanded for broader uses at larger scales. As an example, the Willamette Partnership is forming a conservation banking system in the Willamette Basin that they hope will serve as a prototype for Oregon."[64] In addition, the chapter concludes with a list of "first steps in achieving the goals" of the plan. Among these is the following: "In coordination with various state agencies (i.e., Oregon Department of Transportation, Oregon Department of State Lands, Oregon Department of Energy), explore options for establishing regional 'conservation banks' that could be used to meet mitigation requirements in a manner that benefits Strategy Species and Habitats."[65]

The state significantly expands upon the above recommendation in the section designated "Stepping Down from Statewide to Local." The drafters of the Oregon plan clearly had a sound grasp of banking, including both its potential and its limitations:

> A statewide system of conservation banks would provide a tool for implementing this Conservation Strategy and for achieving statewide habitat conservation goals. Working at the state level allows the banking system to be flexible by receiving mitigation fees and voluntary investments from parts of the state where habitat impacts occur and by developing conservation banks in areas with the highest priority conservation needs. The Conservation Strategy recognizes there are ecologically significant values in both rural and urban areas and prioritization regarding where to invest in conservation banks should take these values into account. The statewide conservation banking system could allow off-site (away from the impact) banking perhaps with an ecoregion focus while other banks could be closer to the project site (same or nearby water-

[64] Oregon Department of Fish and Wildlife. February 2006. "The Oregon Conservation Strategy." p. 25.

[65] Oregon Department of Fish and Wildlife. February 2006. "The Oregon Conservation Strategy." p. 31.

shed). Currently, state and federal requirements for mitigation banks do not always provide flexibility.

Conservation banks can be in-kind (same or similar habitat type) in order to replace lost ecosystem services. In many cases it may be desirable to make out-of-kind (different habitat type) investments when there is opportunity to trade a more common habitat type for an extremely rare one such as Willamette Valley prairie. The statewide conservation banking system would need to balance the benefits of conserving the highest priority habitats (regardless of location and type of impact) with the benefits of replacing impacted habitat with the same habitat and in close proximity.

Careful planning, coordination and management will be needed to create an effective, flexible statewide conservation banking system. Significant coordination will be needed between agencies that set conservation goals, potential and actual conservation bank owners and managers, and agencies or organizations that contribute mitigation fees or voluntary funds toward credits. One or more agencies or organizations would need to take responsibility for coordination, program management, habitat management, measuring performance, monitoring, reporting, and fiscal management.[66]

The discussion in the Oregon Plan references a number of the most important and challenging issues related to banking, most of which are explored in greater detail later in this report. These include issues related to: using banks in one area to offset impacts that occur in more distant areas, offsetting impacts to a particular type of resource by conserving a different type of resource, and dealing with challenges related to the management of bank sites, the monitoring of bank performance, and the coordination of disparate parties.

Only two plans, New Mexico and Colorado, specifically mention a type of banking known as "grass banking." The New Mexico Plan includes the following conservation action for four of its several priority ecoregions: "work with land management agencies, private land managers, and the agriculture industry to identify and promote grazing systems on rangelands that ensure long-term ecological sustainability and integrity and are cost effective for livestock interests. Such practices may include … promoting 'grass banking' opportunities that allow degraded rangelands to recover." Whereas grass banking is listed as twelfth among twelve for the Arizona-New Mexico Mountains Ecoregion, it is the top action for the Chihuahuan Desert Region, and the third highest (among eighteen) for the Western Great Plains Short-Grass Prairie Ecoregion. This suggests that the drafters of the New Mexico Plan gave careful thought to the potential benefits of grass banking and where those benefits were most needed.

The absence of any mention of banking in the majority of plans, and the very brief mention of it in most others, presents a challenge for taking fuller advantage of the plans in the banking context. The paucity of discussion of banking in the various plans might mean that the drafters of those plans were relatively unfamiliar with the topic. On the other hand, it could be that plan drafters were quite familiar with banking, but did not think it was a useful tool to achieve the plans' goals. Still other explanations are possible as well. Given that uncertainty, this report tries to reach a broad audience. It provides a basic understanding of banking, so that those who have been previously unfamiliar with it can better evaluate its potential utility for their plans. At the same time, this report seeks to be more than just a primer on banking by offering analysis that should be helpful to those who already have a solid grasp of the subject.

[66] Oregon Department of Fish and Wildlife. February 2006. "The Oregon Conservation Strategy." p. 82.

Habitat Classification Methods and Their Relationship to Wetland and Conservation Banking

As discussed above, each state was required to cover eight elements in its wildlife action plan. One of the required elements is a description of "locations and relative condition of key habitats and community types essential to the identified species of conservation concern."[67] Guidance issued to the states suggested that the plans should be "spatially explicit, to the extent feasible and appropriate, with a full complement of GIS and other maps."[68]

There is tremendous variation among the approaches states took to describe key habitats essential to the critical species. In very general terms, the state wildlife action plans can be classified into one of five categories based on how they identify critical wildlife habitat: (1) Plans that identify habitat types; (2) Plans that identify top priority habitats; (3) Plans that identify and rank relative priority of habitat types; (4) Plans that identify relative value of parcels within habitat type(s); and (5) Plans that identify general geographic priorities.[69] Each habitat classification method offers a different set of opportunities for the plans to guide wetland and conservation banking. The U.S. Fish and Wildlife Service should consider offering further guidance to the states on these different habitat classification approaches and the relative effectiveness of each in harnessing habitat banking to protect critical wildlife habitat.

Because of the preference for wetland restoration in the §404 program, plans that identify historic wetland acreage where significant wetland functions could be restored would be the most influential in guiding wetland mitigation bank siting and design. In the conservation banking realm, on the other hand, habitat preservation is a legitimate mitigation method and plans that identify high quality existing habitat would provide significant guidance. Plans that are more detailed and site specific would be more useful in guiding site selection, site design, and watershed-based decision-making.

Plans that Identify Habitat Types

Although all of the state wildlife action plans were required to describe "locations and relative condition of key habitats and community types essential to the identified species of conservation concern,"[70] some took a basic approach to identifying habitat types. These states generally provide land cover descriptions or maps for the entire state that indicate the locations of different habitat types. The plans also tend to narratively describe the habitat types and do not identify priority habitats, rank habitat types, or identify the relative value of specific parcels within a habitat type.

Examples of plans that fit this description include Alabama, Maryland, and South Carolina. For example, South Carolina's plan – the *South Carolina Comprehensive Wildlife Conservation Strategy* – identifies 5 ecoregions, 38 habitat types, and 13 "ecobasins" (freshwater aquatic habitats) critical for the protection of the plan's identified priority species. The plan does not identify top priority habitats, rank habitat types relative to one another, or identify relative value of parcels within habitat type. For the most part, the habitat types and their locations are described narratively, although some maps and aerial photos are included in a supplemental volume. The plan states that one of its early implementation objectives is to improve the state's habitat mapping capabilities.[71]

The plans that fall into this category provide little if any guidance on priorities for siting wetland mitigation banks and only provide nominal information to help guide the location of conservation banks.

[67] Association of Fish and Wildlife Agencies. State Wildlife Conservation Strategies: Eight Required Elements. http://www.teaming.com/pdf/eight%20elements%20for%20conservation%20strategies.pdf.

[68] Association of Fish and Wildlife Agencies. State Wildlife Conservation Strategies: Guiding Principles. See: http://www.teaming.com/pdf/state%20strategies%20guiding%20principles.pdf.

[69] The Environmental Law Institute and Environmental Defense worked with the Association of Fish and Wildlife Agencies to identified five broad categories of methods used by the states in their wildlife action plans to fulfill their habitat-related mandate. The categories were developed for the sole purpose of this project and should not be considered to have the official endorsement of AFWA.

[70] Association of Fish and Wildlife Agencies. State Wildlife Conservation Strategies: Eight Required Elements.

[71] South Carolina Department of Natural Resources. South Carolina Comprehensive Wildlife Conservation Strategy. Ch. 3. See: http://www.dnr.sc.gov/cwcs/.

Plans that Identify Top Priority Habitat Type(s)

Several of the state wildlife action plans not only provide information on the location of different habitat types, but also identify priority habitat types. Some of these plans identify where the priority habitats are located but do not weigh the relative importance of habitat types or identify the relative value of specific parcels within a habitat type. Examples of plans that fit this description include Florida, Idaho, Minnesota, and New York.

For example, Florida's plan – *Florida's Wildlife Legacy Initiative* – identifies 45 habitat types in the state and among these identifies 20 top priority habitats based on the relative threat to the habitats. The plan does not rank habitat types but it does include habitat distribution maps. [72] Minnesota took a similar approach. Minnesota: Strategy for Tomorrow's Habitat for the Wild and Rare includes profiles for 25 ecologically defined landscapes within the state. High priority habitats for species in greatest conservation need are identified within each of these ecological landscapes, and maps of priority habitat are provided at the township level.[73] The plan does not assign priority to all of the identified habitat types, nor does it rank habitat types.

Plans that Identify and Rank Relative Priority of Habitat Types

Another set of the state wildlife action plans go a step further and assign relative values to the state's habitat types or top priority habitats. For example, they indicate that white cedar swamp is the highest priority, grassland habitat is the next highest, and oak-hickory forests are the third priority. These state plans may include a ranked list of all habitat types or may rank only the top priority habitats. The plans taking this approach may or may not specify the values used to rank the habitat types. If values or criteria are explicit, this may reveal valuable information, such as potential restorative value (wetland mitigation banking) or existence of large, intact, functioning ecosystems supporting critical wildlife (habitat banking). These plans do not, however, identify the relative value of specific parcels within a habitat type. States that take this approach include Mississippi, Utah, and Wisconsin.

For example, *Mississippi's Comprehensive Wildlife Conservation Strategy* is organized by the state's ecological communities as identified by the Natural Heritage Program. The plan identifies top priority habitats and ranks the habitats relative to one another based on the habitat's value to priority species. The plan primarily relies upon verbal descriptions of these habitat types, rather than maps. It does include maps that show species' ranges, but not specific occurrences.[74] Similarly, the Utah Comprehensive Wildlife Conservation Strategy identifies 25 habitats statewide and further identifies 10 key habitats, one of which is wetlands. These 10 key habitats are assigned relative scores, although the plan does not emphasize these scores to any significant degree. The plan identifies the location of priority habitats by including maps of habitat occurrence. In addition, the plan describes a process underway to identify focal areas for key habitats.[75]

The plans in this category provide far greater information on the relative priority of habitat that could help guide habitat banking, but few of these plans provide much site specific information.

Plans that Identify Relative Value of Parcels within Habitat Types

A small set of the state wildlife action plans identify the relative value of specific parcels within a habitat type. Although these plans may or may not also identify top priority habitats or rank habitat types, they do indicate which specific parcels of a specific habitat type are the most critical and where they are located. Again, the plans taking this approach may or may not specify the values that were used to differentiate

[72] Florida Fish and Wildlife Conservation Commission. Florida's Wildlife Legacy Initiative. http://myfwc.com/wildlifelegacy/.

[73] Minnesota Department of Natural Resources. "Strategy for Tomorrow's Habitat for the Wild and Rare." http://www.dnr.state.mn.us/cwcs/strategy.html.

[74] Mississippi Wildlife, Fisheries & Parks. Mississippi's Comprehensive Wildlife Conservation Strategy. http://www.mdwfp.com/level1/cwcs.asp.

[75] Utah Division of Wildlife Resources. Utah Comprehensive Wildlife Conservation Strategy. http://www.wildlife.utah.gov/cwcs/utah_cwcs_strategy.pdf.

habitat types. States generally taking this approach include Illinois, Massachusetts, and New Jersey.

The *Illinois Comprehensive Wildlife Conservation Plan & Strategy* identifies five top priority wildlife habitat types and ranks the habitat types relative to one another. The upland forest, grassland, wooded wetlands (floodplain forest and swamp), emergent/shallow-water wetlands, and stream habitats are ranked according to their relative importance for species in greatest need of conservation. The plan provides maps of where the high priority habitats are located.[76]

The *Massachusetts Comprehensive Wildlife Conservation Strategy* utilizes the statewide map – the BioMap – developed by the state's Natural Heritage & Endangered Species Program in 2001. The BioMap identified 1,160,000 acres in Massachusetts as Core Habitat and an additional 970,000 acres as Supporting Natural Landscape. Detailed maps, developed through a systematic evaluation of over 7,000 site-specific records of rare plants, rare animals, and natural communities, identify the areas of Massachusetts most in need of protection to conserve biodiversity.[77]

The *New Jersey Wildlife Acton Plan* identifies four priority habitat types, ranks the habitat types relative to one another, and ranks the relative value of parcels within each of the habitat types. The plan utilizes the extensive wildlife habitat mapping already conducted by the Department of Environmental Protection's Endangered and Nongame Species Program – the Landscape Project. The Landscape Project effort produced detailed, site specific maps of the four top habitat types that indicate the relative value of the parcels within each habitat type.[78]

The plans in this category may provide significant guidance on site identification and project design to wetland and conservation bankers. For example, these plans provide information on the location and relative importance of wetland habitat to a wetland mitigation banker looking to identify critical wildlife habitat. Unfortunately, most of the plans provide information on high quality wetland habitat, rather than low quality wetland habitat with high restoration potential. In the context of conservation banking, these plans would provide very valuable site-specific information for guiding the acquisition of parcels of the highest ecological value.

Identification of General Geographic Priorities

Finally, a subset of the state plans takes an entirely different approach. Although these state plans identify priority habitats, they do not distinguish priority sites by habitat type. Examples include California, Nebraska, and Oregon.

The California plan – *California Wildlife: Conservation Challenges* – identifies general geographic priorities within all nine of the state's geographic regions. Within each region the plan provides a ranked list of the geographic priorities, as well as maps identifying areas of critical environmental concern and critical habitat for specific species within the region.[79] The Nebraska plan – *Nebraska Natural Legacy Project* – identifies 40 biologically unique landscapes and provides maps of the geographic priorities. The plan identifies 69 specific heritage ecological areas for terrestrial and aquatic communities. It does not, however identify top priority habitats or rank habitat types.[80] And The *Oregon Conservation Strategy* identifies 165 "conservation opportunity areas" in the state's 8 ecoregions. Maps that depict the opportunity areas are provided for each ecoregion. The plan highlights a subset of "strategy habitats" and ranks the habitat types relative to one another.[81]

[76] Illinois Department of Natural Resources. Illinois Comprehensive Wildlife Conservation Plan & Strategy. http://dnr.state.il.us/ORC/WildlifeResources/theplan/final/Illinois_final_report.pdf.

[77] Massachusetts Division of Fisheries & Wildlife. Massachusetts Comprehensive Wildlife Conservation Strategy. http://www.mass.gov/dfwele/dfw/habitat/cwcs/cwcs_home.htm.

[78] New Jersey Department of Environmental Protection. New Jersey Wildlife Action Plan. http://www.state.nj.us/dep/fgw/ensp/wap/pdf/wap_draft.pdf.

[79] California Department of Fish and Game. California Wildlife: Conservation Challenges. http://www.dfg.ca.gov/wildlife/WAP/.

[80] Nebraska Game and Parks Commission. Nebraska Natural Legacy. http://www.ngpc.state.ne.us/wildlife/programs/legacy/review.asp.

[81] Oregon Department of Fish and Wildlife. February 2006. The Oregon Conservation Strategy. http://www.dfw.state.or.us/conservationstrategy/contents.asp.

Future iterations of the state wildlife action plans would be more effective at directing habitat banking activities to areas designated as critical wildlife habitat if they were to identify wetland restoration opportunities, provide detailed information about the locations of critical habitat, and provide information about the relative ecological value of habitat types and parcels within each habitat type.

Examples of How State Wildlife Action Plans Are Being Used to Guide Wetland and Conservation Banking

Although this study found that few state wildlife action plans identify wetland or conservation banking as a conservation action, the plans are currently being used to guide banking at the federal, district, and state levels. Below are but a few examples of how the plans are being used in conjunction with banking to promote the conservation of wildlife habitat.

At the federal level

In April 2006 a broad team of representatives from eight federal agencies and four state departments of transportation issued a report, "Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects,"[82] which provides a framework for making infrastructure development more sensitive to wildlife. The guide suggests a three-step method for making infrastructure decisions using an ecosystem approach. These include (1) integrated planning, (2) mitigation options, (3) and performance measures. The first step in the framework – integrated planning – suggests that agencies first identify and integrate management plans that have been developed by other groups. The plans can then be used to support the development of a regional ecosystem framework that can help guide compensatory mitigation decision-making. The state wildlife action plans are highlighted as a resource for baseline assessments or inventories of wildlife habitat resources.[83]

At the U.S. Fish and Wildlife Service field office level

Individuals seeking to satisfy their conservation mitigation requirements in the area of California served by the Service's Sacramento field office routinely approach the office for guidance on identifying an appropriate site to offset impacts to species and their habitat. Although not required by existing service policy, the Sacramento field office routinely suggests to bankers that they review the state's wildlife action plan when making bank siting decisions.[84]

At the state level

In January 2006, the Georgia Department of Transportation and the Georgia Department of Natural Resources entered into a Memorandum of Agreement (MOA) to enhance the agencies' coordination on the "identification, acquisition, and stewardship of mitigation lands."[85] The MOA acknowledges the intent of both agencies to promote the objectives outlined in Georgia's state wildlife action plan. In addition to a variety of collaborative efforts envisioned by the MOA, the agreement establishes a coordinating team that is charged with meeting quarterly to develop cooperative goals and objectives.

[82] U.S. Department of Agriculture, U.S. Department of Transportation, Bureau of Land Management, Department of the Army, U.S. Fish and Wildlife Service, National Park Service, U.S. Environmental Protection Agency, National Marine Fisheries Service. April 2006. Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects. Department of Transportation. http://www.environment.fhwa.dot.gov/ecological/eco_index.asp. (Hereinafter Eco-Logical (2006).)

[83] Eco-Logical (2006). pp.12-15.

[84] Sanchez, Kenneth. August 29, 2007. Personal communication. U.S. Fish and Wildlife Service, Sacramento District.

[85] Georgia Department of Transportation and the Georgia Department of Natural Resources. January 2006. Memorandum of Agreement Between the Georgia Department of Transportation and the Georgia Department of Natural Resources.

A Detailed Look at Wetland and Conservation Banking

The following section is designed to give the reader a more in-depth understanding of the range of bank types. It also outlines some of the key issues in banking and how they relate to supporting the conservation objectives of the state wildlife action plans.

A Typology of Banks

Bank types can be categorized in a variety of different ways. For the most part, this report has divided them into the categories of "wetland mitigation banks" and "endangered species conservation banks." However, a "typology" of banks could be constructed based upon a number of other characteristics. For example, within both of the above categories banks could be categorized by bank sponsor. Within this context, there are private, entrepreneurial banks sponsored by owners seeking to generate income and profit from the sale of credits to permittees; public banks that are sponsored by state, federal, or local government entities; and non-profit banks sponsored by private conservation organizations.

Banks also can be categorized according to the nature of the management activity or compensation method that gives rise to credits. For example, there are "preservation" banks that derive their credits from the permanent protection of existing resource values at a site. In contrast, "creation banks" generate credits by creating resource values that are not currently found at the bank site. Banks that restore resource values that may have once existed at the site are sometimes referred to as "restoration banks." Again, some banks may straddle several categories, earning some credits from the preservation of existing resource values and other credits from the creation or restoration of additional resource values. Indeed, the vast majority of wetland mitigation banks generate credits using more than one mitigation method.

Finally, banks can be categorized by the types of credits they offer for sale. Mitigation banks established under §404 of the CWA or parallel state provisions may sell only wetland credits, only stream credits, or both wetland and stream credits.[86] Similarly, some endangered species banks are single-species banks, offering credits to offset impacts to only one species, while others are multi-species banks, offering credits for two or more species. Some banks in California even offer both species credits and a variety of habitat credits.

Several other third-party compensation mechanisms can be developed that provide options for permittees to off-set their mitigation requirements. Umbrella banking is discussed further in Chapter 4, Section a. In-lieu fee mitigation is perhaps the most common alternative form of third-party compensatory mitigation. As with wetland and conservation banking, in-lieu fee mitigation allows the liability for replacing impacted habitat to be transferred from the permittee to a third party.

Under this practice, a party undertaking a development project agrees to pay a stipulated sum into a fund, usually managed by a public agency or by a non-profit organization, the proceeds of which are to be used to undertake various compensatory activities. That is, in lieu of actually undertaking a mitigation project, or of purchasing credits generated from a mitigation bank, the developer simply pays a fee and divests himself from any future liability associated with the success of the compensatory mitigation project. In-lieu fee mitigation arrangements have been used in both the wetlands and endangered species contexts. Indeed, most endangered species regional habitat conservation plans are a form of in-lieu fee mitigation. As development takes place under the HCP, the developers pay a per-acre fee to a local government entity that uses the fees thus generated to acquire and manage other lands for compensatory conservation purposes.

The key differences, therefore, between banking and in-lieu fee arrangements are that before a bank can sell credits, the site must be protected, a banking instrument must be in place, and the banker is required to have secured appropriate financial assurances. In-lieu fee mitigation programs, on the other hand, generally accept payments with only the promise of offsetting impacts before the mitigation sites are secured or the site-specific mitigation plan has been approved. Banking generally entails more specific assurances of the nature of the mitigation activities in advance of permitted impacts and

[86] ELI's 2005 survey found that of the 380 active banks, 87 percent sell only wetland credits, 11 percent sell both wetland and stream credits, 1 percent sells only stream credits. See: 2005 Status Report (2006), p.6.

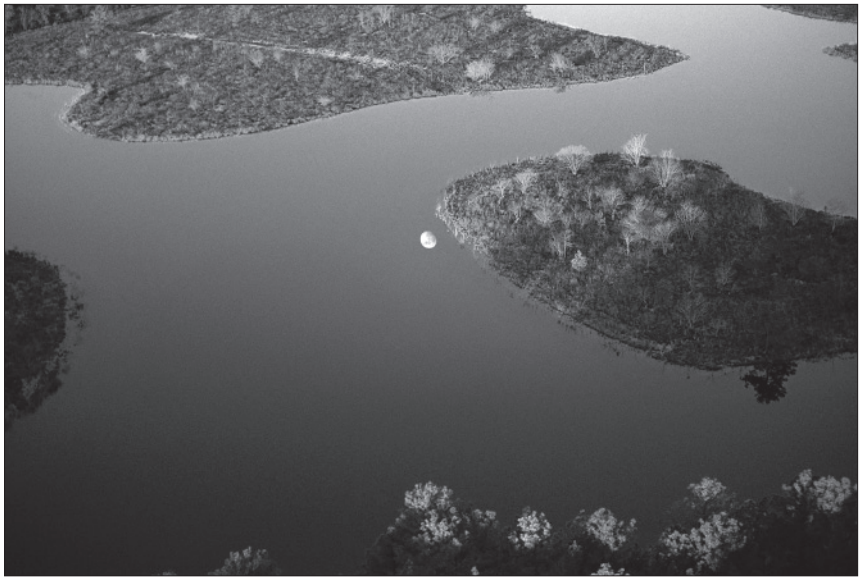
historically, at least, banking has been subjected to more rigorous scrutiny than in-lieu fee mitigation arrangements.[87]

Wetland and stream mitigation banks (§404)

Wetland and stream mitigation banks can generally be divided into one of two categories based on the markets within which the credits are sold: commercial banks, or those that sell credits on the open market to all permittees, and single-user banks (see Table 2).

Commercial banks

Commercial banks may be sponsored by either public entities or private entities, often referred to as entrepreneurial bankers. Public commercial banks are those sponsored by public entities to compensate for losses to wetlands, streams, and other aquatic resources. Their credits may be sold to offset permitted impacts caused by public works projects or private actions. Public commercial banks made up only 4 percent of the 291 approved banks for which data were available.[88]



Green Bayou Wetland Mitigation Bank, sponsored by the Harris County Flood Control District, Houston, Texas.

For example, the Greens Bayou Wetland Mitigation Bank in the Galveston Corps District was approved in 1995 and is sponsored by the Harris County (Texas) Flood Control District.[89] It is a 1,400-acre wetland project that combines wetland creation, mitigation, and natural stormwater runoff treatment.[90] The North Platte Wetland Mitigation Bank in the Omaha Corps District was approved in 2000 and is sponsored by the City of North Platte.[91] The bank was established to compensate for permitted impacts by the City of North Platte, Nebraska, and a private development activity. The City intends to sell credits generated in excess of those needed to address these two projects' impacts to the public.[92]

Private commercial banks make up over 70 percent of the mitigation banks now in operation (see Fig. 4). The number of banks sponsored by private entities has boomed in the past 15 years. In 1992, there was only one private commercial bank in operation. By 2002, there were 135 such banks – 62 percent of the total banks.[93] In 2007, the National Mitigation Banking Association reporting having approximately 65 members.[94] For example, the North Fork Wetlands Bank was approved in 1999 and sponsored by North Forks Wetlands Bank, LLC. The bank was established on a 125-acre cattle pasture in northern Virginia, and includes 7 acres of open water, 76 acres of wetlands, and 42 acres of upland buffers. It has provided compensation credits for wetland impacts from more than

[87] For more on in-lieu fee mitigation, see; Wilkinson, Jessica, Roxanne Thomas, and Jared Thompson. June 2006. The Status and Character of In-Lieu Fee Mitigation in the United States. Washington, DC: Environmental Law Institute. http://www.elistore.org/reports_detail.asp?ID=11151.

[88] 2005 Status Report (2006), p. 7.

[89] 2005 Status Report (2006), p. 65.

[90] Harris County Flood Control District. "Greens Bayou Wetlands Mitigation Bank." http://www.hcfcd.org/greensbayou_wmb.html.

[91] 2005 Status Report (2006), p. 74.

[92] Final Banking Instrument: North Platte Wetland Mitigation Bank, North Platte, Nebraska. June 6, 2000. http://www2.eli.org/pdf/wmb/NE.WMB.N_Platte_Wetland_Mitigation_Bank.pdf.

[93] Banks and Fees (2002), pp. 37-38.

[94] National Mitigation Banking Association. "Who We Are." http://www.mitigationbanking.org/about/index.html.

Table 2. Bank Types

Bank Type	Definition
Private Commercial	Banks sponsored by a private entrepreneur with credits available for sale on the open market.
Public Commercial	Banks sponsored by public entities to compensate for losses to wetlands, streams, and other aquatic resources caused by a combination of public works projects and private development.
Single User	Banks for which the sponsor is also the principal credit user or client.

40 projects. In July 2000, the property was donated to the National Capital Area Council of the Boy Scouts of America to increase the size of an adjacent Boy Scout camp.

Single-user banks

Single user banks are those for which the sponsor is the sole credit user or client. Generally, these are banks developed by public agencies in anticipation of future impacts to wetlands. By developing such a bank, agencies can satisfy their mitigation needs in advance of their impacts. For example, the Illinois Department of Transportation established a single-user bank – the LaGrange Wetland Bank – in Brown County, Illinois in 2004. A historic floodplain, the 1,645-acre site had been drained for farmland. The project will be used exclusively by the transportation agency to offset highway impacts in the region. In the early 1990s, nearly 75 percent of the nation's banks were single-user banks sponsored by state departments of transportation, port authorities, or local governments. Although single-user banks continue to be widespread, they are now far outnumbered by entrepreneurial banks (see Fig. 4).[95]

Umbrella Wetland Banking Programs

An umbrella wetland bank is a programmatic bank; it is characterized by having one mitigation banking instrument that lays out the general requirements of the program and allows for the authorization of future additional bank sites. The banking instrument generally describes the supplemental site-specific information (e.g., individual site plans) that is required to bring a new site on-line.[96] As they are approved, additional sites may be included in the banking instrument as modifications.

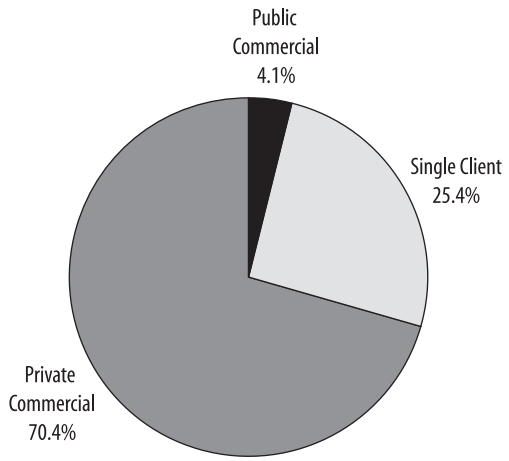


***Figure 4. Mitigation Bank Types:** Proportion of approved mitigation banks (2005) that operate as private commercial banks, public commercial banks, and single client banks (data available for 291 out of 405 approved banks).*

In 2005, the Corps districts reported a total of 33 active umbrella agreements. Although data on the number of individual sites is incomplete, there are at least 204 individual mitigation sites that have been authorized through these programs.[97]

As with non-umbrella banks, umbrella banks can be commercial banks, with credits available to all permittees, or single-user banks, where the sponsor is the sole credit client. ELI's 2006 report found that 24 percent of the approved umbrella banks in the country are public commercial banks, 33 percent are private commercial banks, and 42 percent are single user banks.

The Minnesota Board of Water & Soil Resources operates a public commercial umbrella bank called the Minnesota Wetland Bank. The bank sells wetland credits to the public. As of 2005, the bank had 99 active sites encompassing over 850 acres, 67 sold-out bank sites, and 136 bank sites pending approval.[98]

[95] Banks and Fees (2002), p. 37.

[96] Banking Guidance (1995), § 2,C,2.

[97] 2005 Status Report (2006), pp. 9-10.

[98] 2005 Status Report (2006).

Federal Habitat Conservation Banks for Endangered Species

The regulatory requirements of the Endangered Species Act are the drivers of a set of habitat banks known commonly as "endangered species conservation banks" or simply "conservation banks." The common characteristic of these banks is that they generate credits that can be used to meet mitigation or related obligations of the Endangered Species Act. Unlike most wetland mitigation banks, most endangered species banks are "preservation banks." That is, the bank is established at a site that already has significant endangered species values and credits are generated by the commitment to preserve the site and its associated rare species in perpetuity. As a result, credits at these banks are typically fully available as soon as the bank is established and do not depend upon the success of habitat restoration or creation efforts (though even preservation banks typically obligate the bank owner to undertake active management efforts in order to ensure that initially existing endangered species values are not lost to ecological succession, exotic species, or other threats).

Although most endangered species conservation banks are preservation banks, some are not. For some, credits are only earned as a result of significant habitat restoration or other active management that demonstrably increases the value of the site for endangered species. For example, the number of credits available at International Paper's conservation bank in Georgia for the red-cockaded woodpecker equals the number of new red-cockaded woodpecker family groups that are established on the site. A Utah prairie dog conservation bank established by Utah's School and Institutional Trust Lands Administration earns credits as management efforts there succeed in lifting the three-year running average of prairie dogs on the site above specified thresholds.

One other feature of endangered species conservation banks is that the credits they produce are available only for in-kind mitigation. Unlike wetland mitigation bank credits, which may sometimes be used to compensate for losses of a different type of wetland than the type represented in the bank, endangered species conservation banks cannot be used to compensate for detrimental impacts to one species by measures beneficial to a different species. At least a few conservation banks have been established for the purpose of conserving multiple endangered species. Such banks may thus have credits available for each of the species covered by the bank, but these credits may only be used to offset impacts to that same species elsewhere.

Endangered species conservation banks are more likely to be privately owned banks selling credits to third parties than single-user banks established by public agencies, such as state highway departments. A final characteristic of endangered species conservation banks is that – at least for now – the great majority of them are in a single state, California. There are likely several reasons for this. First, with the exception of Hawaii, California has nearly three times as many federally listed species as any other state. Second, California's booming growth has often put some of these species squarely in the path of development, necessitating creative mitigation ideas. Third, enforcement of environmental regulation is widely thought to have been more vigorous in California than in most other states, thus fostering a willingness to accept such regulation as a cost of business and an inclination to innovate in ways of reducing its cost. Finally, conservation banking started first in California, which gave landowners, lawyers, consultants, and regulators there an early familiarity with the tool that their counterparts elsewhere lacked.

For state wildlife action plans, endangered species conservation banks – particularly those that are designed as "preservation banks" – could provide an alternative means of securing permanent protection of sites that are high priorities for public acquisition or other means of protection. State wildlife agencies should therefore consider carefully how they might influence the selection of bank sites so as to ensure that site selection is done with an eye toward furthering the goals of a state plan. State agencies might themselves be able to protect high priority sites by establishing conservation banks on them, financing the acquisition of such sites through the sale of credits.

State Habitat Conservation Banks

In California at least, most of the federal endangered species banks have also been approved by the state for the sale of credits to meet mitigation requirements imposed by the California Endangered Species Act or other state laws. Because the lists of federally pro-

tected and state protected species are not coterminous in California, some banks there can sell credits for one set of species for federal purposes and for another set of species for state purposes. For example, the Bryte Ranch Conservation Bank in Sacramento County can sell credits for two federally listed vernal pool invertebrates, as well as credits for two birds, the state-listed Swainson's hawk and the unlisted western burrowing owl. Other banks can sell credits that satisfy both state and federal requirements for the same species. For example, the Haera Wildlife Conservation Bank in Alameda County has been approved by the California Department of Fish and Game for the sale of state credits for the San Joaquin kit fox and is awaiting approval by the U.S. Fish and Wildlife Service so that those same credits can be used to meet federal obligations as well.

California is thus far the only state with conservation banks that have clearly habitat-based rather than species-based credits. California's unique experience stems from its 1975 policy on conservation banks, which allows for the establishment of banks that generate credits "to meet any number of resource conservation needs, including compensation for impacts to wetlands, threatened or endangered species, Environmentally Sensitive Habitat Areas, mudflats, sub-tidal areas, and less sensitive resources." That policy, in turn, is a reflection of the broad substantive mandate of the California Environmental Quality Act that "[e]ach public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Thus, some conservation banks in California have been approved by the Department of Fish and Game to sell "oak woodland" credits, "oak-riparian woodland" credits, "chaparral and inland sage scrub" credits, "southern maritime chaparral" credits, "non-native grassland" credits, and "vernal pool" credits, among others.[99]

California's conservation banks (both state and federal) are overwhelmingly private, entrepreneurial banks that sell credits to third parties. In California, far more than any other state, the private sector has embraced conservation banking as an income-generating alternative to traditional development.

Combined Wetland and Species Banks

While "wetland mitigation banks" and "endangered species conservation banks" are two distinct conceptual categories, in fact it is possible for a bank to be both, particularly since many endangered species are wetland dependent. For example, the Clay Station Conservation Bank in Sacramento County has been approved to sell both wetland mitigation credits and endangered species credits for two species of vernal pool invertebrates.

Where banks offer multiple kinds of credits, it is important to stress that current federal policy does not allow a specific credit to compensate for more than one activity. As an illustration, a single bank site may include 20 acres of vernal pools occupied by endangered species. Conceivably, the credits in that bank might represent vernal pool wetlands or vernal pool endangered species habitat, or a combination thereof. However, the bank may only yield a total of 20 credits (assuming an acre equals a credit). The banker can seek to certify the acres as either wetland credits or conservation credits, but cannot sell the 20 credits separately in both markets. Attempts to do so are often referred to as "double dipping." Since the two sets of credits were generated by the same 20 acres of habitat, current Clean Water Act and Endangered Species Act policy disallows the double sale of these credits for two different purposes.[100]

Grass Banking

Yet another type of habitat bank that warrants brief mention is a "grass bank."[101] Grass banks are fundamentally different from either wetland mitigation banks or endangered species conservation banks. The latter are conservation efforts undertaken to mitigate

[99] A list of these banks, with basic descriptions of each, can be found on the agency's web site: http://www.dfg.ca.gov/hcpb/conplan/mitbank/catalogue/catalogue.shtml.

[100] 1995 Mitigation Banking Guidance, §II, D: "In no case may the same credits be used to compensate for more than one activity;…"

[101] The closely related term "grassbank" has been registered as a trademark by the Malpai Borderlands Group, a non-governmental group comprised of ranchers and allied interests in southeast Arizona and southwest New Mexico. This paper uses the terms "grass bank" and "grassbank" interchangeably.

the environmental impacts of development projects upon legally protected natural resources. Grass banks, by contrast, are intended to elicit ranchers to undertake conservation measures that reduce the availability of forage by providing them with compensatory economic benefits. Accordingly, grass banks are of potential interest primarily in the Western states where livestock grazing is a significant economic activity.

Fundamentally, grass banks are a recent variation on a long established tradition of making forage resources available at one location to offset the loss of forage resources at another location due to conservation measures or other factors. The Forest Service, for example, has sometimes used the term "swing allotment" to refer to a public land grazing allotment that is made available for a limited period to livestock displaced from another public land grazing allotment due to fire, drought, or other circumstances limiting grazing opportunities. Grass banks go one step further by requiring that, in return for the opportunity to utilize forage at the bank, a rancher must offer some form of conservation commitment as a quid pro quo exchange. In contrast, under a traditional swing allotment, the rancher was not required to provide anything in exchange for utilizing the allotment.[102]

The first experiment with grass banking took place in southeast Arizona and southwest New Mexico. Ranchers associated with the Malpai Borderlands Group were given the opportunity to utilize forage on the nearby Gray's Ranch, owned by the Animas Foundation. In return, however, the ranchers had to agree to encumber their own property with conservation easements that restricted future development rights. In theory, the value of the conservation easement was to equal the value of the forage provided.

A handful of other grass banks have subsequently been established, primarily by non-governmental conservation organizations such as The Nature Conservancy and The Conservation Fund. To date, only the grass bank for the Malpai Borderlands Group has required the conveyance of a conservation easement in exchange for forage. Other grass banks have allowed the exchange of forage in return for other types of conservation commitments, such as prescribed fire or other range restoration activities that require the displacement of livestock. Where grass banks are established on private land to provide forage for livestock displaced by conservation efforts on other privately owned lands, grass banks are relatively easy to establish, though they are challenging to finance. They become more complex when they involve federal grazing lands.

In 2003, the Bureau of Land Management published an advance notice of proposed rulemaking pertaining to a wholesale revision of its grazing regulations. In that notice, the Bureau announced that it was considering the establishment of a grass bank-like concept that it called "reserve common allotments."[103] It defined these as areas that "would be managed as reserve forage areas for use by permittees whose allotments are undergoing restoration treatments and require rest from grazing. RCA forage would be allocated on a temporary non-renewable basis to permittees participating in restoration on their allotments." Ultimately, the Bureau elected not to pursue the idea due to "a generally unenthusiastic reception during the public scoping process." Ranching interests apparently expressed the worry that it could lead to the loss of grazing privileges on their existing allotments, while some environmental interests feared that it created an incentive for overgrazing on existing allotments. Despite the failure to formalize the concept of "reserve common allotments," it is apparently still possible to establish a grass bank on Bureau land, since the Bureau allows a permittee to graze livestock that the permittee does not own on the permitted allotment.[104]

Proponents of grass banks regard them as a potentially useful conservation tool. First, they make it easier for ranchers to undertake habitat improvement activities on their own land needing a rest from grazing. Second,

[102] See Brunner, Ronald D., Toddi A. Steelman, Lindy Coe-Juell, Christina M. Cromley, Christine M. Edwards, Donna W. Tucker. 2005. Adaptive Governance: Integrating Science, Policy, and Decision-Making. New York: Columbia University Press.

[103] 68 Fed. Reg. 9964 (March 3, 2003).

[104] In contrast, the Forest Service does not allow the a permittee to sublease his allotment to another rancher. See Gripne, Stephanie L. December 2005. Grassbanks: An Evaluation of a Conservation Tool (unpublished Ph.D. dissertation).

for federal land grazing permittees, grass banks make it easier to maintain operations while restoration efforts are undertaken on their leased federal lands, thus increasing the likelihood that the ranch can remain viable, rather than be put at risk of sale for development.

For purposes of state wildlife action plans, grass banks may present a few opportunities worthy of exploration. For example, the grass bank at The Nature Conservancy's Heart Mountain Ranch has facilitated the temporary removal of livestock from over 5,000 acres of elk winter range and the improvement of 3,600 acres of sage grouse habitat through prescribed burning and mechanical treatment.[105] Thus, where state plans identify priority areas or priority species that could benefit from habitat enhancement efforts, grass banks may facilitate the restoration efforts. Of course, states do not have to wait for non-governmental conservation organizations to establish grass banks. They could establish their own banks on the extensive rangelands that many Western states already manage.

Key Issues in Banking

Banking – wetland mitigation banking, conservation banking, and other forms of banking – have several characteristics that warrant particular consideration when determining the usefulness of these tools for meeting conservation objectives. Different forms of banking carry with them their own set of strengths and weaknesses which should be fully weighted before embarking on a conservation strategy that relies heaving on banking. Many of the issues outlined below can, however, be adequately managed to maximize the conservation values of banking.

Ecological Effectiveness

Wetland Mitigation Banks

The "success" of wetland mitigation banking can be judged on whether a bank is meets administrative and/or ecological performance measures. Administrative performance refers to the degree to which compensatory mitigation projects meet their permit requirements, such as submitting monitoring reports in a timely manner, while ecological performance refers to meeting ecological standards that ultimately result in a compensatory wetland that replaces lost aquatic resource functions.

Administrative performance

A review of the representative peer reviewed and grey literature on the administrative performance of compensatory mitigation reveals that mitigation projects across the country often fail to comply with their permit conditions. A 2001 review of 19 studies of mitigation implementation typifies the general permit compliance scenario for the nation's compensatory mitigation projects. Ten of the reviewed studies found that the majority of evaluated projects were compliant with permit conditions, while 9 studies found that only 4 to 49 percent of the projects were fully compliant.[106]

Seven more recent studies had similar results; 4 found that the majority of the projects reviewed complied with all permit conditions,[107] while 3 found that only 18 to 48 percent of projects complied with all permit conditions.[108] A 2002 study of compensatory mitigation in New Jersey found that on average mitigation projects met only 48 percent of their design requirements

[105] Bond, Kathleen. November 1, 2005. "The Heart Mountain Grassbank: A Case Study." See: www.partnershipresourcecenter.org/resources/stories/stories-features/heart-mountain-grassbank.pdf.

[106] Turner, R.E., A.M. Redmond, J.B. Zedler. 2001. "Count It By Acre of Function—Mitigation Adds Up to Net Loss of Wetlands." National Wetlands Newsletter 23(6).

[107] Ambrose and Lee 2004 – 69 percent; Cole and Shaffer 2002 – 60 percent; Minkin and Ladd 2003 – 67 percent; and Sudol and Ambrose 2002 – 55 percent. Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002; Cole, C.A. and D. Shaffer 2002. Section 404 Wetland Mitigation and Permit Success Criteria in Pennsylvania, USA, 1986-1999. Environmental Management 30(4): 508-515; Minkin, P. and R. Ladd 2003. Success of Corps-Required Mitigation in New England, USACE New England District; Sudol, M.F., and R.F. Ambrose. 2002. The U.S. Clean Water Act and habitat replacement: evaluation of mitigation sites in Orange County, California, USA. Environmental Management 30: 727-734.

[108] Ambrose et al. 2006 – 46 percent; Brown and Veneman 2001 – 43 percent; and MDEQ 2001 – 18 percent. Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002; Brown, S. and P. Veneman. 1998. Compensatory Wetland Mitigation in Massachusetts. Massachusetts Ag Experiment Station, University of Massachusetts; Michigan Department of Environmental Quality. 2001. Michigan Wetland Mitigation and Permit Compliance Study. Lansing, MI: Land and Water Management Division.

and permit specifications.[109] Similarly, a 2006 study of 143 permit files from California found that these projects complied with 73 percent of permit conditions.[110] Monitoring, submission, and long-term maintenance requirements seem to be the criteria that most often go unmet, while vegetation criteria are more frequently met.[111]

In 2005, the Government Accountability Office (GAO) published a review of the Corps' oversight of compensatory mitigation in a representative sample of Corps districts. The GAO found that the districts performed limited oversight to determine the status of required compensatory mitigation. The districts did, however, provide somewhat more oversight for mitigation conducted by mitigation banks and in-lieu fee mitigation than for permittee responsible mitigation.[112] Achieving the habitat conservation objectives of the state wildlife action plans through banking would be greatly enhanced if improvements were made to the administrative oversight of wetland mitigation banking.

Replacing Acres and Functions

Permit compliance has been an on-going problem for compensatory mitigation. Studies of the ecological performance of compensatory mitigation have shown that compensatory wetland projects fail to replace lost wetland acres and functions even more often than they fail in their administrative performance. In addition, permit compliance has been shown to be a poor indicator of whether or not mitigation projects are adequately replacing the appropriate habitat types and ecological functions of wetlands.

Replacing Acres

Several studies have questioned the success of wetland compensatory mitigation in replacing lost wetland acreage. In its comprehensive national study on compensatory mitigation, the NRC reported that between 70 to 76 percent of mitigation required in permits is actually implemented.[113] A review of mitigation sites in Michigan found that only 29 percent of the permits implemented the required amount of mitigation, and a study in California found that 54 percent of sites met acreage requirements.[114] Several other studies have had similar results, concluding that the §404 program is failing to compensate for lost wetland acres.[115]

[109] Balzano, S., A. Ertman, L. Brancheau, W. Smejkal, A.S. Greene, M. Kaplan, and D. Fanz. 2002. Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey. NJ Department of Environmental Protection, Division of Science, Research, & Technology.

[110] Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.

[111] Ambrose et al. 2006, Ambrose and Lee 2004, DeWeese and Gould 1994. Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002; Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002; DeWeese, J. and C. Gould. 1994. An evaluation of selected wetland creation projects authorized through the Corps of Engineers Section 404 Program. US Department of the Interior, Fish and Wildlife Service, Sacramento Field Office, Sacramento, California, 90 pp.

[112] For the 60 mitigation banks that were required to submit monitoring reports, 70 percent of the files showed that the Corps had received at least one monitoring report. The percentage of the mitigation bank files with evidence that the Corps conducted an inspection ranged from 13 to 78 percent. U.S. Government Accountability Office. September 2005. Wetlands Protection: Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring. Washington, DC: GAO. GAO-05-898.

[113] NRC (2001).

[114] Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002.

[115] Allen, A. O., and J. J. Feddema. 1996. Wetland loss and substitution by the Section 404 Permit Program in southern California, USA. Environmental Management 20: 263-74; Balzano, S., A. Ertman, L. Brancheau, W. Smejkal, A.S. Greene, M. Kaplan, and D. Fanz. 2002. Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey. NJ Department of Environmental Protection, Division of Science, Research, & Technology; Gallihugh, J.L. and J.D. Rogner 1998. Wetland Mitigation and 404 Permit Compliance. Vol. 2. U.S. Fish and Wildlife Service. Chicago, IL. June 1998; Johnson, P., D.L. Mock, A. McMillan, L. Driscoll, and T. Hruby 2002. Washington State Wetland Mitigation Evaluation Study. Phase 2: Evaluating Success. Washington State Department of Ecology. February 2002. Publication No. 02-06-009; Sudol, Mark F. 1996. Success of Riparian Mitigation as Compensation for Impacts Due to Permits Issued Through Section 404 of the Clean Water Act in Orange County, California. Dissertation for Doctor of Environmental Science and Engineering. University of California, Los Angeles. 215 pp; Wilson, Renee F. and William J. Mitsch. 1996. Functional Assessment of Five Wetlands Constructed to Mitigate Wetland Loss in Ohio, USA. Wetlands 16(4): 436-451.

Replacing functions

In addition to not meeting acreage requirements, mitigation wetlands often do not replace the functions and types of wetlands destroyed due to permitted impacts. In a 2001 review, researches found that an average of only 21 percent of mitigation sites met various tests of ecological equivalency to lost wetlands.[116] Two recent studies comparing mitigation sites to impact sites found that only 17[117] and 29[118] percent of the mitigation sites evaluated successfully replaced lost functions. The former study also found that 50 percent of the mitigation sites evaluated were actually non-jurisdictional riparian and upland habitat.[119] Of 8 studies comparing mitigation sites to reference wetlands, 3 found that just over 50 percent of mitigation sites were ecologically successful,[120] but 5 studies found that fewer than 50 percent of the sites evaluated were considered ecologically successful.[121] A statewide study of 143 permit files in California found that 27 percent of the constructed mitigation did not even meet the jurisdictional definition of a wetland.[122]

Several studies have also found that compensatory mitigation results in a shift in wetland type. A study of 31 mitigation sites in Indiana found failure rates of 71 percent for forested mitigation sites, 87 percent for wet meadow areas and 42 percent for shrub areas, but only 17 percent of the shallow emergent areas and 4 percent of open water areas were failures.[123] These results indicate that mitigation may be resulting in the replacement of forested mitigation sites with shallow emergent and open water community types. Similar results have been reported in New Jersey, where a study of that state's mitigation program found that emergent wetlands were the only wetland type that achieved a greater than 1:1 replacement ratio, while forested wetlands were successfully replaced at a ratio of only 0.01:1.[124] A Pennsylvania study of 23 §404 permits issued from 1986-1999 showed that only 45 percent of the mitigation wetlands were of the same type as the impact sites and that the mitigation had resulted in a shift from wetlands dominated by woody species to less vegetated mitigation wetlands and a replacement of scrub-shrub, emergent and forested wetlands with open water ponds or uplands.[125]

[116] Turner, R.E., A.M. Redmond, J.B. Zedler. 2001. "Count It By Acre of Function—Mitigation Adds Up to Net Loss of Wetlands." National Wetlands Newsletter 23(6).

[117] Minkin, P. and R. Ladd 2003. Success of Corps-Required Mitigation in New England, USACE New England District.

[118] Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002.

[119] Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002.

[120] Allen and Feddema 1996 – 55 percent; McEnespy and Hymanson 1997 – 50 percent; and Zentner 1987 – 65 percent. Allen, A. O., and J. J. Feddema. 1996. Wetland loss and substitution by the Section 404 Permit Program in southern California, USA. Environmental Management 20: 263-74; McEnespy, M. B., and Z. P. Hymanson. 1997. Examination of Past Wetland Projects Permitted by the California Coastal Commission: A report card on project performance. Unpublished Manuscript. Pp. 1-30; Zentner, J. J. 1987. Wetland Restoration Success in Coastal California: 1975-1985. Wetland and Riparian Ecosystems of the American West. Eighth Annual Meeting of the Society of Wetland Scientists, Technical Coordinators K. M. Mutz, and L. C. Lee, 122-24.

[121] Ambrose et al. 2006 – 19 percent; DeWeese and Gould 1994 – 10 percent; Johnson et al. 2002 – 46 percent; MDEQ 2001 – 22 percent; and Sudol and Ambrose 2002 – 16 percent. Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002; DeWeese, J. and C. Gould. 1994. An evaluation of selected wetland creation projects authorized through the Corps of Engineers Section 404 Program. US Department of the Interior, Fish and Wildlife Service, Sacramento Field Office, Sacramento, California, 90 pp; Johnson, P., D.L. Mock, A. McMillan, L. Driscoll, and T. Hruby 2002. Washington State Wetland Mitigation Evaluation Study. Phase 2: Evaluating Success. Washington State Department of Ecology. February 2002. Publication No. 02-06-009; Michigan Department of Environmental Quality. 2001. Michigan Wetland Mitigation and Permit Compliance Study. Lansing, MI: Land and Water Management Division; Sudol, M.F., and R.F. Ambrose. 2002. The U.S. Clean Water Act and habitat replacement: evaluation of mitigation sites in Orange County, California, USA. Environmental Management 30: 727-734.

[122] Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.

[123] Robb, J.T. 2001. Indiana Wetland Compensatory Mitigation: Area Analysis. Indiana Department of Environmental Management. EPA Grant #CD985482-010-0.

[124] Balzano, S., A. Ertman, L. Brancheau, W. Smejkal, A.S. Greene, M. Kaplan, and D. Fanz. 2002. Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey. NJ Department of Environmental Protection, Division of Science, Research, & Technology.

[125] Cole, C.A. and D. Shaffer. 2002. "Section 404 Wetland Mitigation and Permit Success Criteria in Pennsylvania, USA." 1986-1999. Environmental Management 30(4): 508-515.

Several recent studies of bank sites indicate that banks are generally no more successful at replacing lost acres and functions than permittee-responsible mitigation. A 1999 study reported a net loss of 21,000 acres of wetlands due to inclusion of enhancement and preservation as mitigation methods at bank sites.[126] A comprehensive review of 12 mitigation bank sites in Ohio found that 25 percent of the bank areas studied were not wetlands.[127] Of the wetland acreage, 25 percent was considered in poor condition, 58 percent was fair, and 18 percent was good quality in terms of vegetation as compared to natural reference wetlands. The study also found that amphibian community composition and quality was significantly lower at banks than natural forest, shrub, or emergent wetlands and pond-breeding salamanders and forest dependent frogs were virtually absent from the bank sites. Overall, of the banks studied, three were mostly successful, five were successful in some areas and failed in others, and four mostly failed. A recent study from Florida found that of the 29 banks evaluated 70 percent fell within the moderate to optimal range of function. Although the baseline conditions of most sites were in the high functional range, most of the projects relied upon enhancement, rather than restoration, as the mitigation method.[128]

Mitigation and wildlife habitat

Only a handful of studies on compensatory mitigation attempt to address the ability of compensatory mitigation to replace wildlife habitat lost through the §404 program. These studies indicate that compensatory mitigation sites are not effectively replacing lost wildlife habitat. One study reported that over half of the mitigation sites evaluated did not adequately compensate for wildlife habitat services lost due to permitted activities.[129] Only 41 percent of the studied sites had successfully replaced wildlife habitat and connectivity, while replacement failed at 38 percent of sites (25 of these sites were considered extreme failures). In Washington State, 55 percent of the sites surveyed in one study had only a moderate contribution to wildlife functions,[130] while in a New Jersey study the wildlife suitability assessment criteria achieved the lowest score of all the assessment criteria used to evaluate the mitigation sites.[131] The New Jersey study reported that, on average, mitigation sites provided limited protective cover, adjacent food sources, and nesting habitat for wildlife and that there were moderate human impediments to wildlife use of the sites.

Although wetland mitigation and, more specifically, wetland mitigation banking account for a significant annual investment in habitat restoration and protection, wetland mitigation has not, to date, proven to be a reliable conservation tool. One study that looked at both permit compliance and functional replacement suggests that, despite the nationwide "no net loss" goal, compensatory mitigation actually leads to an 80 percent net loss in wetlands acres and functions.[132] Although compliance with permit conditions has a poor track record, and many compensatory mitigation projects do not include wildlife criteria in their design and performance standards,[133] a recent California study suggests that the ecological success of compen-

[126] Brown, P., and C. Lant. 1999. "The effect of wetland mitigation banking on the achievement of no-net-loss." Environmental Management 23(3): 333-345.

[127] Mack, J.J and M. Micacchion. 2006. An Ecological Assessment of Ohio Mitigation Banks: Vegetation, Amphibians, Hydrology, and Soils. Ohio EPA Technical Report WET/2006-1. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio.

[128] Reiss, K.C., E. Hernandez, M.T. Brown. 2007. An Evaluation of the Effectiveness of Mitigation Banking in Florida: Ecological Success and Compliance with Permit Conditions. Florida Department of Environmental Protection #WM881. EPA Grant #CD 96409404-0.

[129] Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002.

[130] Johnson, P., D.L. Mock, A. McMillan, L. Driscoll, and T. Hruby 2002. Washington State Wetland Mitigation Evaluation Study. Phase 2: Evaluating Success. Washington State Department of Ecology. February 2002. Publication No. 02-06-009.

[131] Balzano, S., A. Ertman, L. Brancheau, W. Smejkal, A.S. Greene, M. Kaplan, and D. Fanz. 2002. Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey. NJ Department of Environmental Protection, Division of Science, Research, & Technology.

[132] Of the 178 hectares of mitigation required for every 100 hectares of impacts annually, 134 (75 percent) are actually implemented, 77 to 104 hectares (58 – 78 percent) complied with permit conditions, 16 to19 hectares (20 percent) of wetland functions were compensated. This estimate suggests that, despite the national "no net loss" goal, compensatory mitigation actually leads to an 80 percent net loss in wetlands acres and functions due to compensatory mitigation. Turner, R.E., A.M. Redmond, J.B. Zedler. 2001. "Count It By Acre of Function—Mitigation Adds Up to Net Loss of Wetlands." National Wetlands Newsletter 23(6).

[133] "None of the compensatory mitigation projects visited by the committee included design and evaluation criteria for animals…" NRC (2001), p. 31.

satory mitigation could be improved by improving the permit conditions and performance standards themselves.[134] Assuming that compliance records improve, improving permit conditions may help to ensure that compensatory mitigation more effectively replaces lost wildlife and aquatic resource functions.

Conservation Banks

In contrast to the literature regarding the effectiveness of wetland mitigation and wetland mitigation banking, there is very little literature on the effectiveness of endangered species mitigation practices generally or of endangered species conservation banking in particular. The most significant study that touched on this topic was undertaken in 1999 under the sponsorship of the National Center for Ecological Synthesis (NCEAS) and the American Institute of Biological Sciences (AIBS).[135] The NCEAS/AIBS study examined in detail some 43 habitat conservation plans, focusing on the use of science in such plans. The study did not examine the actual implementation of any of these HCPs; rather, it focused solely on the content of the plans and associated documents and drew its conclusions from those resources.

Among the matters examined in the NCEAS/AIBS study were the mitigation requirements in the HCPs. The study attempted to assess the quality of data that were used to justify the mitigation measures required in the plans, based on whether there was published literature evaluating the effectiveness of those measures for the species in question. In general, the study found that "the quality of data used to justify mitigation measures was relatively low."[136] Lacking any long-term information on the actual success of mitigation measures, the study instead attempted to assess the likelihood of success by considering whether required mitigation measures addressed the primary threats to a species and the extent to which they were likely to reduce those threats. The study authors concluded that "although HCPs most often identify the primary threat to the affected species, only a little more than half of the time do mitigation plans adequately address that threat."[137]

The NCEAS/AIBS study did not compare HCPs that utilized banks to HCPs that did not. It did note, however, that about a fifth of the HCPs it examined employed habitat banks as a mitigation measure and the study concluded that the data to support the use of banking was generally lower than that available to support other mitigation measures. However, the NCEAS/AIBS authors may have used a definition of banking that is broader than that used in this report. The NCEAS/AIBS report described habitat banks as involving "the payment of money into an account, which is then to be used to purchase land that is supposedly ideal habitat for the species threatened by the proposed activities."[138] The NCEAS/AIBS definition more accurately reflects that for "in-lieu fee" mitigation arrangements, as defined earlier, rather than conservation banks.

Interestingly, one of the best studies of the actual implementation of HCPs was done by a pair of newspaper reporters who wrote a series of feature articles for the Seattle Post-Intelligencer in May 2005.[139] That series, titled "License to Kill," documented a broad array of implementation failures, including inadequate monitoring, delays in taking required actions, funding insufficiencies, and, in the case of HCPs pertaining to northern spotted owls, failure of those plans to anticipate or respond to population declines apparently caused by the expanding range of another owl, the barred owl. Unlike the NCEAS/AIBS report, the newspaper series makes no effort to systematically evaluate HCPs according to uniform criteria. It is instead more of a qualitative assessment based on anecdotes about particular plans. Like the NCEAS/AIBS report, it makes no distinctions between HCPs that utilize

[134] Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.

[135] Kareiva, Peter et al., 1999. Using Science in Habitat Conservation Plans. American Institute of Biological Sciences. See: www.aibs.org/bookstore/resources/hcp-1999-01-14.pdf.

[136] Kareiva, Peter et al., 1999. Using Science in Habitat Conservation Plans. American Institute of Biological Sciences. p. 26.

[137] Kareiva, Peter et al., 1999. Using Science in Habitat Conservation Plans. American Institute of Biological Sciences.

[138] Kareiva, Peter et al., 1999. Using Science in Habitat Conservation Plans. American Institute of Biological Sciences.

[139] The series is available at http://seattlepi.nwsource.com/specials/licensetokill/.

conservation banks and those that do not, although most of the HCPs it discusses are ones that do not use banks.

A recently launched study seeks to evaluate the effectiveness of such banking by undertaking a detailed evaluation of ten bank properties.[140] Unlike the NCEAS/AIBS study, which only reviewed documents, the study, which is supported by the Electric Power Research Institute, will be largely built around field assessments of bank properties to determine how they are actually performing their intended functions. Although final results are not expected until 2009, they will likely yield the first rigorous assessments of conservation banking performance.

Siting of Banks

Wetland Mitigation Banks

Site selection is viewed as one of the most critical factors influencing wetland mitigation bank success.[141] The proposed wetland compensatory mitigation rule puts considerable emphasis on the importance of site selection, stating that "site selection is a primary consideration for compensatory mitigation projects."[142]

How it works

The location of proposed wetland mitigation bank is a decision made on the part of the wetland mitigation banker. Although the MBRTs and Corps districts may provide significant guidance on selecting sites, the agencies do not have the authority to require or direct mitigation bankers to locate mitigation projects in specific areas, such as those identified as critical wildlife habitat in the state wildlife action plans.

Presumably, the primary objective of the private mitigation banker is to provide mitigation credits to permittees in a manner that maximizes profits and minimizes risk. As such, decisions about where to site wetland banks may be heavily influenced by land costs and may favor mitigation methods that are less expensive and have a high degree of success and the mitigation of wetland types that are more easily restored, rather than sites with complex ecological needs. As a result, wetland mitigation banking may actually be shifting wetland resources from urban to rural areas where land prices are less expensive and from more complex to more simple systems.[143]

Although MBRTs cannot require banks to be located in specific areas, the teams do evaluate proposed banks and suggest alterations. If their concerns are significant, the banker may be forced to go back to the drawing board and select another site. Bankers that are knowledgeable about the criteria used by the MBRTs in evaluating site suitability are likely to spend less time and money negotiating the location and design of their banks.

Criteria used in evaluating sites

The criteria used by the MBRT to evaluate a bank site can have a significant effect on guiding banks to priority wildlife habitat. The 1995 federal guidance on wetland mitigation banking suggests that the wetland regulatory agencies "give careful consideration to the ecological suitability of a site for achieving the goal and objectives of a bank."[144] The guidance also lists other factors that should be taken into consideration, including the size of the bank, location of the site relative to other resources (including upland resources and endangered species), hydrologic sources, land use and habitat status and trends, compatibility with adjacent land uses, and watershed management plans.[145] The recommendation that bank site evaluation take into consideration "local or regional goals for the restoration or protection of particular habitat types or functions (e.g., re-establishment of habitat corridors or habitat for species of concern)" directly relates to the implementation of the state wildlife action plans.[146]

In its 2001 report, the National Research Council (NRC) voiced significant concerns over the poor success of wetland compensation in replacing lost aquatic

[140] Fox, Jessica. September 2007. Personal communication.

[141] NRC (2001); "Guidance for Selecting Compensatory Wetland Mitigation Options." Research Results Digest. No. 251.

[142] Proposed Compensatory Mitigation Rule (2006), pp. 15,526.

[143] Ruhl, J.B. and James Salzman. March-April 2006. "The Effects of Wetland Mitigation Banking on People." National Wetlands Newsletter. Vol. 28, No. 2.

[144] Banking Guidance (1995), § II, B. 2.

[145] Banking Guidance (1995), § II, B. 2.

[146] Banking Guidance (1995), § II, B. 2.

resources.[147] In an effort to improve the success rate of compensatory mitigation, NRC made two very influential recommendations that relate to site selection: the 10 operational guidelines and the watershed approach.

Guidelines for Improving Site Selection

The NRC stressed the importance of selecting mitigation sites that are likely to become self-sustaining.[148] The Committee offered 10 "Operational Guidelines for Creating or Restoring Self-Sustaining Wetlands."[149] The operation guidelines suggest, for example, identifying sites that duplicate the features of naturally occurring local wetlands, sites where wetlands previously existed (i.e., restoration), sites that are resistant to disturbance from surrounding land uses, and sites that do not require over-engineered structures in their design. These guidelines were reissued as guidance by the Corps in 2002.[150]

The Watershed Approach

Another closely related recommendation relates to making site selection decisions in a watershed context. NRC recommended that the federal wetland mitigation program make site selection decisions that "follow from an analytically based assessment of the wetland needs in the watershed and the potential for the compensatory wetland to persist over time."[151] This recommendation to adopt a watershed approach was embraced by the Corps in its 2002 compensatory mitigation guidance[152] and has been further elaborated upon in the proposed mitigation rule.[153]

There are many opportunities for wetland mitigation banking to support the habitat conservation objectives of the state wildlife action plans in the context of the watershed approach contemplated in the proposed rule. As outlined in the proposed rule, the watershed approach provides a framework under which compensatory mitigation decisions can consider, among other things, "habitat requirements of important species…, as well as the requirements of other regulatory and non-regulatory programs that affect the watershed, such as…habitat conservation programs."[154] The state wildlife action plans can be a solid basis for this habitat analysis.

The proposed rule also describes the type of information that should be utilized in watershed-based decision-making and suggests that this information may be contained in existing plans. The state wildlife action plans could be an excellent source for information on, for example, "the presence and needs of sensitive species."[155]

Finally, the proposed rule states that a watershed approach involves consideration of, among other things, state interests "including the requirements of other programs and objectives, such as habitat conservation…"[156] In circumstances where a formal watershed plan does not exist, EPA and the Corps could require or encourage the consideration of the state wildlife action plans, along with information from other appropriate sources.

Relying upon the watershed approach to guide selection of bank sites can help contribute to maintaining habitat diversity, connectivity, and appropriate proportions of habitat types needed to enhance the long-term stability of the priority wildlife habitat identified in the state wildlife action plans.

Other bank siting considerations

The §404 compensatory mitigation program seeks to replace lost wetland functions and services in close proximity to the site of impact. In addition to replacing acres, replacing wetland functions is a primary concern of the program. Wetland functions are "the physical, chemical, and biological processes that occur

[147] NRC (2001), p. 3.

[148] NRC (2001), pp. 4-5.

[149] NRC (2001), pp. 5, 123-128.

[150] RGL 02-2 (2002), Appendix B.

[151] NRC (2001), p. 4.

[152] RGL 02-2 (2002) § 2.

[153] Proposed Compensatory Mitigation Rule (2006), § 332.3(c).

[154] Proposed Compensatory Mitigation Rule (2006), p. 15535 and §332.3(c)(2)(i); p. 15547 and §230.92(c)(2)(i)).

[155] Proposed Compensatory Mitigation Rule (2006), p. 15536 and §332.3(c)(3); p. 15548 and §230.92(c)(3)).

[156] Proposed Compensatory Mitigation Rule (2006), § III, pp. 15523. Emphasis added.

in aquatic resources and other ecosystems,"[157] and include water quality improvement, wildlife habitat, and flood protection.

Wetland services, on the other hand, are the benefits humans derive from wetland functions,[158] including wildlife viewing, flood attenuation, water filtration, and sediment capture.[159] Replacing lost wetland services is a challenge since many of the authorized impacts to wetlands are in more urban or densely populated locations where restoration options are few. Indeed, the majority of restoration opportunities are in more rural areas where the ability of people to appreciate wetlands are few.

A recent empirical study of wetland mitigation banking found that banking facilitates "the redistribution of wetland resources from urban to rural areas," thereby shifting the ecosystem services of wetlands away from where people live.[160] A wetland mitigation bank may be designed appropriately to provide flood attenuation and water quality functions. But unless that wetland bank is in reasonable proximity to the community where the impacts occurred, the population may be more prone to flood damage and less likely to derive the water quality services provided by the mitigated wetlands.

If wetland mitigation banks are to provide both wildlife functions and services to human population centers, these considerations need to be taken more fully into consideration. One other possible approach is to decouple wetland functions and replace them at different geographic locations. Proposed federal rules suggest that, within a watershed context, in some circumstances it may be most ecologically beneficial to replace certain wetland functions on-site, such as water quality and flood protection functions, and others, such as wildlife functions, off-site.[161]

[157] Proposed Compensatory Mitigation Rule (2006), § 332.2.

[158] Proposed Compensatory Mitigation Rule (2006), § 332.2.

[159] Ruhl, J.B. and James Salzman. March-April 2006. "The Effects of Wetland Mitigation Banking on People." National Wetlands Newsletter. 28(2): 1, 9-14.

[160] Ruhl, J.B. and James Salzman. March-April 2006. "The Effects of Wetland Mitigation Banking on People." National Wetlands Newsletter. 28(2): 1, 9-14.

[161] Proposed Compensatory Mitigation Rule (2006), Preamble, § II.

Conservation Banks

The siting of both wetland and conservation banks is especially important, since it will significantly influence the amount and nature of conservation benefit to be gained from any bank. The U.S. Fish and Wildlife Service's conservation banking guidance characterizes site selection as one of two issues of "paramount importance" in evaluating any conservation bank (the other is the management program associated with the bank). That guidance devotes several paragraphs to the topic and articulates a few general principles. Most fundamentally, the Service guidance indicates that a bank site should either be capable of supporting a viable population of the species for which it is intended, or at least contribute to the maintenance of such a population by expanding an existing area managed for the species. Attention to surrounding land use trends and management activities is also an important part of site selection. Anticipated land use changes nearby could, for example, undermine the conservation utility of a proposed bank site. Alternatively, careful site selection could locate a bank in a place where it can provide replacement habitat for currently suitable habitat nearby that may become unsuitable due to natural succession and lack of management.

The Service guidance makes the further point that recovery plans for federally listed species rarely identify particular parcels as priority sites for conservation attention (whether through banks or otherwise). Rather, such plans often identify "broader areas within which recovery efforts will be focused." The guidance suggests that banks can generally be most usefully sited within these broadly identified areas. The same conclusions are likely to apply with equal or greater force to state wildlife action plans, most of which identify priority areas at a fairly high level of generality. The challenge for state wildlife action plan implementers will be to step down from the broadly identified priority areas to influence actual site selection for particular banks.

Complicating this task is that, within certain ill-defined limits, private parties who want to establish conservation banks have considerable flexibility to establish them wherever they choose. State or federal conservation agencies can influence bank site selection in a variety of ways, most particularly through the

crediting process. That is, under almost any conceivable metric, banks sited in high priority locations ought to produce more credits than similarly sized banks located elsewhere. A prospective private conservation bank owner may still be free to establish a bank in a non-priority area, but the very factors that make it a non-priority area ought to limit the number of credits that can be generated by a bank there.

In practice, however, methodologies to quantify credits associated with any particular bank are often quite simple. At their simplest, some banks are simply awarded a number of credits equal to the number of "suitable" acres included in the bank, with no effort to distinguish degrees of suitability. Thus, would-be bankers often establish banks wherever suitable habitat occurs, an outcome that renders planning efforts largely superfluous. Where it is not possible to establish more nuanced crediting systems, it may be necessary for conservation agencies to prescribe where banks can or cannot be established, perhaps through a process of prior approval of acceptable bank sites.

Although not discussed in the Service's guidance, a further important consideration in the siting of any conservation bank is the nature of the bank. If it is a "preservation" bank that generates credits simply by preserving existing high quality habitat, banks should presumably only be approved if they have been previously identified as needing long-term protection (on an acquisition priorities list, for example) or if they meet certain general criteria for long-term protection. On the other hand, for "restoration" or "creation" banks, which generate credits by creating or restoring certain types of habitat, there is inherently more latitude to locate these banks wherever they may produce significant resource benefits. The ability of state wildlife action plans to influence the siting of conservation banks may thus depend on whether the action plans focus exclusively on preserving existing high quality habitats or whether they also seek to guide future restoration activities.

Finally, bank site selection has an obvious relationship to the identification of bank "service areas" (i.e., the areas within which projects can mitigate their adverse impacts by purchasing credits from the bank). Bank service areas are discussed later (see below, "Balancing Conservation and Economic Objectives: Establishing Bank Service Areas").

Bank Review Process

The process of reviewing and approving wetland and conservation banks offers several opportunities for federal and state agencies to encourage the design of banks in a manner that maximizes their contribution to the conservation of critical wildlife habitat and at-risk species.

Wetland Mitigation Banks

Along the way to bank approval, MBRTs provide bank sponsors with early feedback on the location and design of proposed banks. There are several opportunities for MBRTs to encourage bank sponsors to design banks in a manner that would support the protection of critical wildlife habitat and species.

Wetland mitigation banks that sell credits to compensate for impacts under §404 must be approved by a federal interagency Mitigation Bank Review Team. The role of the MBRT is to "facilitate the establishment of mitigation banks through the development of mitigation banking instruments."[162] MBRTs are generally comprised of representatives from the Corps, EPA and the Service. Representatives from the National Marine Fisheries Service (NMFS) and the Natural Resources Conservation Service (NRCS) are also commonly members, as are representatives from state, tribal, and local regulatory and resource agencies, particularly in areas where these agencies' authorities or mandates directly affect or are affected by banks. An ELI survey found that state wildlife agencies serve on only about half of the nation's 40 MBRTs.[163]

Federal policy dictates that the Corps serves as the chair of the MBRT, except where a state or other local entity has a strong regulatory presence, in which case that agency may serve as co-chair. Although MBRTs are not required to achieve consensus on bank approval and oversight, they are encouraged to "strive to obtain

[162] Banking Guidance (1995), § II, C.,3.

[163] Environmental Law Institute. July 2007. Unpublished data developed for the Training Course for Interagency Mitigation Bank Review Teams, sponsored by the Environmental Law Institute and The Conservation Fund.

consensus…"[164] When consensus cannot be reached, the chair of the MBRT has the ultimate authority to make final decisions on the terms and conditions of the banking instrument.

Bank sponsors are encouraged to meet with the MBRT for a pre-application consultation in advance of submitting a mitigation banking instrument.[165] Prospective bank sponsors are then encouraged to submit a bank "prospectus".[166] Only after addressing the agencies' feedback on the prospectus does the bank sponsor submit a draft mitigation banking instrument, which includes the mitigation plan. The bank instrument may go through one or more iterations before it is finalized.

Because MBRTs usually include all the state agencies with regulatory responsibilities for the habitat and/or species covered by the bank, there may be ample opportunity for these groups to rely upon the state wildlife action plan to guide site selection, bank review and approval, credit types and amounts, and other factors. State wildlife agencies can be encouraged to play a more active role on the MBRT to ensure that proposed banks take key wildlife habitat and species of conservation concern into account.

Conservation Banks

The process for reviewing and approving conservation banks is less formally structured than the process applicable to wetland mitigation banks. Indeed, prior to the issuance of the Service's Guidance, there was no formal federal process for reviewing and approving conservation banks. The State of California's "Official Policy on Conservation Banks" also did not address the topic in any detail. As a result, conservation banks have been approved in a variety of ways, a fact that has contributed to the current uncertainty about how many conservation banks there actually are.

The Service's 2003 Guidance has brought greater clarity and certainty to this matter. Although it never specifically requires either of these, it clearly contemplates that conservation banks will be established via a legally binding "conservation bank agreement" and that a "conservation bank review team" will oversee the establishment of the bank.

The Service's Guidance sets out a non-exclusive list of 23 "main components" that are to be included in each banking agreement. Among the more important of these components are a management plan for the bank property, a description of the bank's service area, the number and kind of conservation credits within the bank, and performance standards that the bank must meet.[167] Not all of the enumerated 23 main components are clear. For example, one of the required components is listed as "[c]ompliance with applicable State and Federal laws such as State endangered species acts." What that means is rather opaque.

Other parts of the Service's Guidance say that a banking agreement must include items not included in the list of 23 main components. For example, it states that a banking agreement "must identify and include a requirement for adequate funding to provide for the conservation bank's operation, management, monitoring, and documentation costs."[168] In contrast, the only mention in the section's list of main components that pertains to funding is a requirement for contingency funding plans in the event that the obligations of the banking agreement are not fulfilled.[169] There is a puzzling reference in another section to a "mitigation agreement" that probably was intended to refer instead to a "banking agreement" since there is no other mention in the Guidance of "mitigation agreements."[170] It specifies that the rationale for any differential weighting of credits or debits associated with similar activities in different places should be clearly explained in "the mitigation agreement or elsewhere." This requirement also does not appear in the list of 23 major components.

The Guidance says very little about the workings of "conservation bank review teams," which it defines as "an interagency group of Federal, State, tribal and/or

[164] Banking Guidance (1995), § II, C.,3.

[165] RGL 02-2 (2002). § 3.

[166] Banking Guidance (1995), § II, C.

[167] Guidance on Conservation Banks (2003), § II.E.2.

[168] Guidance on Conservation Banks (2003), § II.D.4.

[169] Guidance on Conservation Banks (2003), § II.E.2.

[170] Guidance on Conservation Banks (2003), § II.C.3.

local regulatory and resource agency representatives that are signatories to a bank agreement and oversee the establishment, use, and operation of a conservation bank." Apart from this definition, the Guidance mentions such review teams only twice, and then only in passing. Those brief mentions provide that the parties to a banking agreement should establish a review team and that state and local agencies that participate in a bank agreement should be part of the team. The only specific task of the team otherwise mentioned in the Guidance is that of receiving monitoring reports submitted to it in accordance with the terms of a banking agreement.

Characterization and Quantification of Credits and Debits

The goal of any form of compensatory environmental mitigation is to secure some resource gain from conservation efforts at a mitigation site to compensate, or off-set, a resource loss at an authorized impact site. Of necessity, this requires that resource agencies be able to characterize and quantify the relevant gains and losses at the two sites in a manner that allows for a meaningful comparison. This is an inherently difficult task, but it bears emphasis that it is a task that resource agencies must undertake regardless of the mitigation method employed (i.e. project-by-project versus banking). In order to avoid completely arbitrary project-by-project mitigation decisions, resource agencies responsible for setting mitigation requirements must do so in accordance with some consistently applied principles.

Whereas the principles that guide project-by-project compensatory mitigation decisions are often not readily discerned, those that apply to wetland and conservation banks are generally quite transparent. Indeed, one of the virtues of banking may be that it obliges resource agencies to clearly articulate the consistent principles upon which their mitigation decisions will be made. Those principles determine not only how many credits a bank may offer, but also how many of those credits will be required to compensate for specific resource losses at impact sites.

Wetland Mitigation Banks

Wetland mitigation banks need a system for evaluating the amount of functional loss at the impact site and the amount of functional gain at the bank site to determine the amount of compensation required to offset the functional loss. The "currency" that is used to evaluate the amount of compensation that is required is a wetland credit. A wetland mitigation bank credit is defined as a "unit of measure representing the accrual or attainment of aquatic functions" at a bank.[171] Credits are generally characterized by a functional measure, acres, or some combination thereof.

The anticipated number of credits that the bank will generate is generally outlined in the bank instrument. Before credits may be released for sale they must be certified by the MBRT. The banking instrument also specifies the method or methods that will be used to certify credits. Federal guidance states that mitigation should provide for functional replacement and suggests that bank sponsors use an "appropriate functional assessment methodology"[172] to assess the results of compensatory activities and determine the number of credits that will be available at the bank. In order to evaluate whether or not functional replacement is being achieved, the same functional assessment methodology used to evaluate credits at the compensation site should be used to evaluate debits at the impact site.

Several federal guidance documents have stated that in the absence of more definitive information on the functions of a specific wetland site, a minimum one-to-one acreage replacement may be used as a reasonable surrogate to achieve no net loss of wetland functions.[173] In practice, banks often rely on acreage, or some combination of functional assessment, acreage, and best professional judgment, to determine the number of credits available.

Functional equivalency measures

Although the use of functional equivalency measures for determining credits remains the goal, the devel-

[171] Banking Guidance (1995), § III. F.

[172] Banking Guidance (1995), § D.7.

[173] 1990 MOA, § III. B.; Banking Guidance (1995), § 2.d.7.; RGL 02-2 (2002), § 2.d.4.

opment and use of such tools has been a challenge. Over 40 rapid wetland assessment techniques have been identified.[174] Best known among these is the hydrogeomorphic approach to assessing wetland functions, also know as HGM. With support from the Corps, researchers began development of HGM approaches in the early 1990s.[175] HGM attempts to evaluate current wetland functions and predict potential changes to a wetland's functions that may result from proposed activities. The method relies upon comparing the target wetland with "reference wetlands," similar wetlands that are relatively unaltered.[176]

HGM requires the development of regional guidebooks for specific wetland subclasses. For example, separate assessment models are needed for riparian systems, herbaceous depressional, and slope wetlands in the northern Rocky Mountains, forested slope wetlands in New England, and coastal fringe wetlands in the Gulf of Mexico.[177] In 1997, the Corps released a "National Action Plan to Implement the Hydrogeomorphic Approach," the goal of which was to develop HGM models to guide 80 percent of the Corps permit actions requiring wetland function assessment. [178] A 2002 evaluation of the development and application of HGM found that HGM was not being applied as envisioned in the 1997 National Action Plan. The application of HGM had been hampered by, among other things, its time consuming nature and the fact that it requires a sophisticated and wide-ranging skill set for its application.[179]

In addition to HGM, several other national functional assessment methodologies have been developed, such as the Wetland Evaluation Technique (WET), Wetlands Rapid Assessment Procedure (WRAP), and Habitat Evaluation Procedures (HEP).[180] Several states, regions, and Corps districts have also developed their own functional assessment methodologies. For example, in May 2007, the Corps' Wilmington District, proposed for adoption the North Carolina Wetlands Assessment Method (NC WAM) for use in the state by the Corps and the North Carolina Divisions of Water Quality and Coastal Management.[181]

A recent Florida law[182] required the state Department of Environmental Protection to work with the water management districts, local governments, and relevant federal agencies to develop a state-wide method to determine the amount of mitigation required for regulatory permits. The Uniform Wetland Assessment Method (UMAM) rule[183] went into effect on February 2, 2004, and is now the primary functional assessment tool used by the state and local regulatory entities. In California, the California Rapid Assessment Method (CRAM) is gaining greater acceptance for assessing the performance of compensatory mitigation projects.[184] In Minnesota, the Minnesota Routine

[174] Kusler, Jon and William Neiring. March-April 1998. "Wetland Assessment: Have We Lost Our Way?" National Wetlands Newsletter. 20(2):1, 9-14. For more on existing functional assessment methodologies see Environmental Law Institute. April 2004. "Measuring Mitigation: A Review of the Science for Compensatory Mitigation Performance Standards." Washington, DC: Environmental Law Institute; Bartoldus CC. 1999. A Comprehensive Review of Wetland Assessment Procedures: A Guide for Wetland Practitioners. Environ. Concern Inc. This is an extensive introduction to 40 different wetland assessment procedures that provide a procedure for identifying, characterizing, or measuring wetland functions and/or social benefits.

[175] Cole, Andrew Charles and James G. Kooser. March-April 2002. "HGM: Hidden, Gone, Missing?" National Wetlands Newsletter. 24(2): 1, 16-18.

[176] U.S. Environmental Protection Agency. July 1998. Wetland Biological Assessments and HGM Functional Assessment. Fact Sheet: EPA843-F-98-001f.

[177] U.S. Army Corps of Engineers. June 20, 1997. "The National Action Plan To Implement the Hydrogeomorphic Approach To Assessing Wetland Functions." Federal Register 62(119): 33607-33620.

[178] U.S. Army Corps of Engineers. June 20, 1997. "The National Action Plan To Implement the Hydrogeomorphic Approach To Assessing Wetland Functions." Federal Register 62(119): 33607-33620.

[179] Cole, Andrew Charles and James G. Kooser. March-April 2002. "HGM: Hidden, Gone, Missing?" National Wetlands Newsletter. 24(2): 1, 16-18.

[180] Banks and Fees (2002), pp. 24, 59.

[181] U.S. Army Corps of Engineers, Wilmington District. May 21, 2007. Public Notice. See: http://www.saw.usace.army.mil/wetlands/Notices/2007/PN-NCWAM-7-2007.pdf.

[182] Fla. Stat. ch. 373.414(18).

[183] Fla. Admin. Code Ann. R. 62-345.

[184] Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2006. "California Rapid Assessment Method (CRAM) for Wetlands and Riparian Areas." See: www.cramwetlands.org.

Assessment Method (MnRAM) for Evaluating Wetland Functions was first developed in 1991 to fill the need for a practical assessment tool that would help local authorities make sound wetland management decisions as they assumed responsibility for regulating wetland impacts.[185,186]

ELI's 2002 study found that eight states have policies that require or recommend the use of functional assessment methods. In practice, only approximately 13 percent of the banks reviewed in 2002 (25 banks) indicated that a functional assessment methodology was used to quantify credits.[187] The federal wetland agencies acknowledge the shortcomings and challenges of fully applying functional assessment techniques to evaluate wetland credits and lost aquatic resources. The functional assessment techniques available today may be overly complex and costly and require extensive technical expertise, without providing sufficiently accurate and applicable results to warrant general use in the compensatory mitigation process.[188]

Functional measures and wildlife

In addition to the challenges associated with functional assessment methods discussed above, some questions remain about the ability of these tools to address specific functions of wetlands, such as the provision of wildlife habitat. Assessment methods generally measure the structural features of wetlands and use these measures to infer functional equivalence.[189] As described by the NRC, HGM and most other functional assessment procedures "do not specifically lay out design parameters that guarantee the likelihood that…desired animals will be reestablished…"[190] HEP, on the other hand, was developed to quantify fish and wildlife habitat, but does not consider functions other than habitat for fish and wildlife.[191]

Acreage-based measurements

Although the use of acreage as a proxy for wetland functions is simple, straight forward, and does not require significant technical expertise, basing credits on acreage assumes that the functional value of one acre of the lost wetland will equal the functional value of one acre of the mitigation wetland. Although this may be true in some circumstances, a straight acreage measure would lead to a net loss of wetland functions where a high functioning wetland is being replaced with a lower quality wetland. In a 2002 survey, ELI found that the majority of banks – 61 percent (125 banks) – defined credits by acreage. Several states, including Indiana, Michigan, Missouri, and Wisconsin, allow credits to be defined solely by acreage.[192]

Other approaches

A significant portion of wetland mitigation banks – 23 percent (46 banks) – were found to rely upon an approach that combined functional assessment and acreage based measures. Most of these banks primarily rely on wetland acreage to evaluate credits and then apply one or more functional measures to check or supplement the evaluation. Other banks rely on best professional judgment along with some measure of functionality.[193] Many of these combined approaches afford a compromise betweens straight acreage-based methods and the more time consuming functional assessment methodologies. However, the full application of functional assessment methodologies remains the goal of the wetlands compensatory mitigation program.

[185] Minnesota Board of Soil and Water Resources. May 1, 2007. Comprehensive General Guidance for Minnesota Routine Assessment Method (MnRAM): Evaluating Wetland Function, Version 3.1. See: http://www.bwsr.state.mn.us/wetlands/mnram/MnRAM_Guidance.pdf.

[186] For additional information on state and regional rapid assessment procedures see: Fennessy, M. Siobhan, Amy D. Jacobs, and Mary E. Kentula. January 2004. Review of Rapid Methods for Assessing Wetland Condition. U.S. Environmental Protection Agency, National Health and Environmental Effects Laboratory. See: http://www.epa.gov/owow/wetlands/monitor/RapidMethodReview.pdf.

[187] Banks and Fees (2002), pp. 58-59.

[188] Kusler, J. and W. Niering. "Wetland Assessment: Have We Lost Our Way?" National Wetlands Newsletter 20:2 (March-April 1998): 1, 9-14.

[189] Environmental Law Institute. April 2004. Measuring Mitigation: A Review of the Science for Compensatory Mitigation Performance Standards. Washington, DC: Environmental Law Institute. p.11.

[190] NRC (2001), p. 135-136.

[191] Brumbaugh, Robert and Richard Reppert. National Wetland Mitigation Banking Study: First Phase Report. Alexandria, VA: Institute for Water Resources, February 1994. IWR Report 94-WMB-4. 32.

[192] Banks and Fees (2002), pp. 60-61.

[193] Banks and Fees (2002), pp. 59-60.

Many of the functional assessment methodologies take landscape condition into consideration. HGM and other tools that rely on the availability of high quality reference wetlands depend on stable regional conditions for their continued use.[194] To the extent that state wildlife action plans provide clear information on the condition of wildlife habitat, they may be helpful in informing efforts to measure the functional capacity of wetland impact and compensation sites. Applying the plans in this way would help ensure that wildlife functions are more fully considered in wetland compensatory mitigation projects.

Conservation Banks

The U.S. Fish and Wildlife Service's conservation banking guidance is quite explicit that "[e]very conservation banking agreement should specify the methods for determining credits within the bank and debits outside the bank." In general, those methods should be the same.

What then, does a credit (or debit) attempt to measure? The answer depends upon the goals of the regulatory program in which banking is used. The central goal of the Endangered Species Act, for example, is ensuring the survival of endangered and threatened species. Thus, if one could measure the amount by which a particular development project reduced the likelihood that a particular species would survive, one could compensate for that development project by carrying out a conservation project that increased the species' probability of survival by a like amount. Because the means of precisely measuring probabilities of survival are lacking, however, the Service's guidance recognizes that surrogate measures, such as acres of habitat or number of nesting pairs affected, must typically be used. For example, International Paper's bank for the red-cockaded woodpecker equates credits with the number of active woodpecker groups on the property, while the Utah School and Institutional Land Trust Administration bank for the Utah prairie dog contemplates the release of credits in a series of steps as the three-year running average Utah prairie dog population on the bank site surpasses specified milestones.

Although the Service's guidance acknowledges the practical reality that surrogates such as acres affected by conservation or development actions will generally be used rather than actual measures of impact on survival probability, the guidance also encourages the use of weighting schemes to reflect the greater value of some acres in comparison to others. Thus, the rules that govern how many credits or debits are associated with particular actions could take into account not simply the number of acres affected, but the quality of the habitat, its configuration, its proximity to protected areas, and its "contribution to regional recovery efforts."[195] This last factor suggests a useful symbiosis between conservation banking efforts and state wildlife action plans. That is, to the extent that state wildlife action plans set forth, or foster the development of, clear regional conservation strategies, land parcels that contribute to the fulfillment of those strategies are likely to be more valuable to would-be bankers than other parcels that do not, even if the habitats on the parcels are otherwise the same.

Credits for Publicly Funded Activities?

Federal policies for both wetland mitigation banking and endangered species conservation banking deal somewhat similarly with the question of whether publicly funded activities can give rise to credits. Both policies clearly allow public agencies to establish banks, and the practice of state or local transportation departments doing so is well established. Thus, to the narrow question, "may credits be earned for publicly funded activities," the answer is clearly in the affirmative.

The more significant question is under what circumstances publicly funded activities may not give rise to credits. The federal wetland mitigation banking guidance says that "Federally-funded wetland conservation projects undertaken via separate authority and for other purposes" such as the Wetlands Reserve Program and Partners for Fish and Wildlife Program, "cannot be used for the purpose of generating credits within a mitigation bank." The guidance goes on to say, however, that "mitigation credit may be given for activities undertaken in conjunction with, but supplemental to, such programs in order to maximize the overall

[194] Brinson, Mark M. and Richard Rheinhardt. February 1996. "The Role of Reference Wetlands in Functional Assessment and Mitigation." Ecological Applications 6(1): 69-76.

[195] Guidance on Conservation Banks (2003), § II, C, 3.

ecological benefit of the conservation project."[196] For example, if a landowner were to commit to manage in perpetuity a wetland restored under a 15-year Partners for Fish and Wildlife agreement, some credit would be available under the §404 mitigation program since the landowner is going above and beyond that which the federal program is supporting.

Note that the guidance only specifically addresses federally funded wetland conservation projects. On its face, the guidance does not appear to limit the use of state or local funds to carry out wetland conservation projects that generate credits within a bank.

The Banking Guidance also addresses crediting for banks established on public lands. It states: "Mitigation credits generated by banks [on public lands] should be based solely on those values in the bank that are supplemental to the public program(s) already planned or in place, that is, baseline values represented by existing or already planned public programs, including preservation value, should not be counted toward bank credits."[197] So, for example, if a bank is established within a state park, credits may only be certified for restoration or other mitigation activities that enhance the functions of the site and for which the agencies involved had not already planned or secured funding.

Federal conservation banking guidance, on the other hand, lumps together federal, state, and local programs benefiting endangered species and says that where such programs are used to achieve permanent protection of particular lands, the Service "will not recommend, support, or advocate the use of such lands as conservation banks for mitigating impacts to species listed under the ESA."[198] Thus, the conservation banking guidance is more restrictive than the wetlands mitigation banking guidance, at least when public funds from any source have been used to protect sites permanently. The Service's view seems to be that if particular sites have been protected through other means, they are ineligible to become banks that can sell or use credits to offset the adverse impacts of future projects elsewhere.

In one other respect, however, the conservation banking guidance seems to draw a distinction between federal funding and other sources of governmental funding. That is, the guidance says that "[w]here Federal funds have been used in the establishment of a bank, the allocation of credits to the bank will be proportionate to the non-Federal contribution. A bank capable of sustaining 10 credits, but with a 50 percent Federal contribution, will be allocated 5 credits."[199] This statement is not particularly noteworthy, except for the fact that it only applies to federal funding. If, for example, that same hypothetical bank capable of sustaining ten credits had a 50 percent state contribution rather than a 50 percent federal contribution, the federal guidance would seem to allow recognition of all ten credits (how those credits would be allocated between the state and its private partner would presumably be up to them to decide). At least that is the implication of the guidance's silence on the question of a banking project that receives a funding contribution from a state or other non-federal public source.

Both the wetland banking guidance and the endangered species conservation banking guidance thus appear to allow a state either to establish a bank of its own or to contribute financially to the establishment of a bank by another. Doing the latter may be a way in which states can influence the siting of privately owned banks in priority conservation areas identified in state wildlife action plans. In effect, states may be able to steer private investments toward banks that further state wildlife action plan goals by offering financial inducements unavailable to banks elsewhere.

Duration and Character of Management at Bank Sites

Wetland Mitigation Banks

There are several stages in the life of a wetland mitigation bank, including the operational stage of the bank, when the terms of the banking instrument are in effect and bank credits are being generated and sold, and the long-term management phase, the period after the credits have been sold and performance standards

[196] Banking Guidance (1995), § II, B, 2.

[197] Banking Guidance (1995), § II, B, 2.

[198] Guidance on Conservation Banks (2003), § II, B, 4.

[199] Guidance on Conservation Banks (2003), § II, B, 4.

have been met.[200] Different management requirements generally apply during each of these distinct phases. Requirements for each phase should be spelled out in the banking instrument.

Before a wetland mitigation bank can sell credits, the bank site must be secured.[201] In practice the Corps requires most, if not all, banks to be protected in perpetuity.[202] The exceptions are in Louisiana, where the life of marsh mitigation banks is only 20 years and 50 years for forested wetland mitigation banks[203] and banks sited on public lands. In 2002, ELI reported that of the 54 banks on public lands nationwide, fewer than half of the authorizing instruments specify the legal assurances for land protection.[204]

Existing federal guidance states that wetland mitigation banks should be protected using "appropriate real estate arrangements."[205] Although the agencies do not require a specific type of protection mechanism, enforcement problems encountered with deed restrictions led the Corps to suggest in 2002 that conservation easements are preferable to deed restrictions.[206] Regardless, the instrument used should restrict uses that might "jeopardize the purpose of the bank."[207]

Financing of bank management – remedial and long-term

The 1995 Banking Guidance states that the bank sponsor is responsible for establishing two types of funds to ensure the operation and long-term protection of the bank: remedial funds and long-term management funds.[208] The banking instrument should identify the terms of both funds and the entity responsible for holding the funds and carrying out the required activities.

Remedial funds are those set aside to "cover contingency actions in the event of bank default or failure."[209] The amount of funds required should be adjusted to reflect the risk of the bank failing to meet its performance standards and the amount of credits released before ecological performance standards have been met. Financial assurances for remedial actions may be phased-out or reduced as the bank's performance standards are met.[210] For example, the banking instrument for WetBank – Gunnison in Colorado indicates that 33 percent of the performance bond will be released upon establishment of wetland vegetation, 33 percent upon establishment of woody riparian vegetation, and the final 34 percent upon attainment of noxious weed control.[211]

Long-term management funds are those designed to provide the long-term steward of the site – either the bank's sponsor or a third party to whom the real estate protection instrument had been transferred – with the resources necessary to carry out the long-term management responsibilities spelled out in the banking instrument. The entity taking on the long-term stewardship of compensation sites should secure adequate funding to provide for the long-term management needs of the sites. One California non-profit organization that specializes in the long-term management of wetland and habitat mitigation sites, the Center for Natural Lands Management, has developed a tool for calculating adequate long-term management financial needs. The Property Analysis Record (PAR) is a computerized database methodology that estimates the costs of management activities and generates reports to substantiate long-term funding requirements, including endowments.[212]

The state wildlife action plans all provide detailed information on conservation actions for species of conservation concern. If these actions are sufficiently well-developed for wetland species, they could be

[200] Banking Guidance (1995), § II, E, 1.

[201] Banking Guidance (1995), § II, D, 6.

[202] Banks and Fees (2002), p. 80. Of the 219 instruments reviewed, 76 percent indicated the mechanism that would be used to protect the land in perpetuity.

[203] La. Admin. Code tit. 43:I, §724. Banks and Fees (2002), p. 85.

[204] Banks and Fees (2002), p. 44.

[205] Banking Guidance (1995), § II, E, 2.

[206] RGL 02-2 (2002), § 3, g.

[207] Banking Guidance (1995), § II, E, 2.

[208] Banking Guidance (1995) § II, E, 2.

[209] Banking Guidance (1995), § II, E, 5.

[210] Banks and Fees (2002), p. 67.

[211] Still Water - Ohio Creek, LLLP. Banking Instrument for the WetBank – Gunnison Wetland Mitigation Bank. Banking Instrument. Gunnison County, CO. 1999. p. 16.

[212] For more on PAR see: http://www.cnlm.org/cms/index.php?option=com_content&task=view&id=21&Itemid=155.

factored into the management requirements for the bank during both its active and long-term management phases. The costs of these actions could also be included in any assessment of the remedial and long-term management funding needed to ensure that the bank replaces lost wildlife functions.

Financial assurance mechanisms

Financial assurances may be "in the form of performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, legislatively-enacted dedicated funds for government operated banks or other approved instruments."[213] The federal guidance does not provide MBRTs or bank sponsors with additional direction on the most appropriate form of financial assurances, but a failed bank in New Jersey offers some caution against assuming all financial assurances are equally effective. The New Jersey bank used performance bonds as a financial assurance. When the bank first showed signs of failure the state regulatory agency's mitigation council attempted to call their bond. The threat of calling the bond caused the developer to begin to implement remedial actions at the site, and new bonds were posted to cover the additional work necessary to bring the bank into conformance. A year later, however, the bank sponsor filed for Chapter 11 protection and then went bankrupt. The agency subsequently discovered that the sponsor had failed to pay the bond premiums, making it impossible to call the bond. As a result of this experience, the state now recommends that banks use a letter of credit for their financial assurance.[214] This example demonstrates that, at a minimum, financial assurances should be current for the life of the bank, not renewable on an annual or bi-annual basis. Additionally, because calling financial assurances can be difficult, bank instruments should include provisions for the suspension of the release of credits if the bank is operating at a deficit as a less cumbersome first step in enforcement.[215]

The transfer of bank ownership

In some cases, mitigation banks remain the property of the bank sponsor, even after all of the credits are sold. Banks sponsored by private entities, however, more often seek to transfer the long-term ownership of the bank to a natural resource agency, such as a state wildlife agency, or to a non-profit organization, such as a land trust. If a bank site is transferred to a third party, the banking instrument should indicate the party that will be responsible for holding the fee title or other real estate protection instruments (e.g. conservation easements), carrying out management responsibilities, and managing the long-term stewardship endowment.[216] A stewardship endowment is an agreed upon contribution that funds long-term stewardship activities. These funds should be invested such that the interest generated each year is sufficient to cover the annual level of funding needed to carry out management obligations. In some cases, these arrangements can be complicated. For example, the bank sponsor may retain the fee title to a bank site and transfer a conservation easement on the site to a land trust. In some cases, the land trust may then hold the easement and retain the stewardship endowment but the responsibility for carrying out the long-term management duties may remain with the banker. The banker may then need to make annual requests to the land trust for the funds to cover the management activities.

Bank monitoring & reporting

Mitigation banking instruments spell out the bank sponsor's monitoring and reporting requirements. The instrument should indicate the monitoring parameters that must be measured and should be "based on scientifically sound performance standards prescribed for the bank."[217] Monitoring provisions should be designed to provide the MBRT with sufficient information to determine if performance standards are being met and when remedial measures are necessary. Reporting provisions generally indicate the intervals at which the bank sponsor must submit monitoring reports to the MBRT.

[213] Banking Guidance (1995), § I, E, 5.

[214] New Jersey Department of Environmental Protection. Telephone Interview. 28 Mar. 2002.

[215] Banks and Fees (2002), p. 68-69.

[216] For more information on the role of land trusts in taking over the long-term stewardship of wetland mitigation sties, see: Kihslinger, Rebecca L., Jessica Wilkinson, Palmer Hough and Sherry Teresa. 2007. "Taking on the Long-Term Stewardship of Wetlands Mitigation Sites." Exchange. Vol. 26, No. 2. Washington, DC: Land Trust Alliance.

[217] Banking Guidance (1995), § II, E, 3.

The 1995 Banking Guidance states that monitoring should be conducted until the MBRT is "confident that success is being achieved (i.e., performance standards are attained)."[218] It suggests that this period will typically be five years but that it may be necessary to extend the monitoring period for projects that take longer to become established, such as forested wetlands. NRC's 2001 study concluded that a five-year monitoring period may not be sufficient for determining whether mitigation goals will be achieved, particularly for many restored systems.[219] Ideally, banks should tie their required monitoring periods directly to achieving final performance criteria. In practice, ELI's 2002 study found that the majority (60 percent) of banks require monitoring for five years. Twelve percent of the banks reviewed (15 banks) required monitoring until specific performance standards were met; and one bank had a monitoring period of five years or until performance standards were met.

State wildlife agencies can take a lead role in working with the MBRT to design monitoring provisions for the resident wetland species that are listed as species of concern in the state wildlife action plan.

Credit release

In the perfect case, MBRTs would not allow banks to sell credits until after the lost aquatic resource functions are fully replaced, thus eliminating any temporal functional loss. However, the federal agencies acknowledge the significant up-front financial investment and risk incurred by wetland mitigation bankers. In response, the agencies allow some percentage of the bank's anticipated credits to be debited before the bank meets all of its performance standards. The agencies suggest that the amount or percentage of credits allowed for early release should be commensurate with the amount of financial assurances that are in place and the bank's likelihood of success.[220] Credits may then be release in phases (i.e. phased credit release), as banks meet ecological performance standards.

"Performance-based" credit release tied to meeting ecological performance standards is one of the strengths of wetland mitigation banking. In practice, however, banks are often allowed to sell credits before any performance standards are met or any mitigation activities are carried out on the ground. The agencies do suggest that three minimum requirements be met prior to any debiting: (1) the banking instrument and mitigation plans are approved; (2) the bank site has been secured; and (3) the appropriate financial assurances have been established.[221] When preservation is the mitigation method employed all credits are often released as soon as the appropriate legal and real estate protections are secured.[222] In these cases, the financial security for long-term management should be provided as credits are sold (i.e., the endowment is funded incrementally concurrent with credit sales).

ELI's 2002 study found that as many as 92 percent of the nation's banks allow credits to be released from a bank in advance of the bank meeting all of its performance standards and 90 percent allow credits to be sold prior to meeting any performance standards.[223]

Performance standards

Performance standards are the measurable outcomes of a wetland compensatory mitigation project that can be used to determine if a compensatory mitigation project is meeting its stated objectives.[224] A bank's monitoring requirements are often tied to performance standards – the monitoring parameters that the sponsor must measure and report are designed to demonstrate to the MBRT that the performance standards are being met. And, meeting performance standards is often the basis for a bank's credit release schedule.

The 1995 Banking Guidance suggests that performance standards should be "tailored to the specific restoration, creation or enhancement activity at the bank site or through the use of an appropriate functional assessment methodology."[225] The NRC study suggested that

[218] Banking Guidance (1995), § II, E, 3.

[219] NRC (2001), p. 112.

[220] Banking Guidance (1995), § II, D, 6.

[221] Banking Guidance (1995), § II, D, 6.

[222] Banking Guidance (1995), § II, D, 6.

[223] Banks and Fees (2002), p. 63-64.

[224] NRC (2001), p. 15.

[225] Banking Guidance (1995), § II, D, 6.

the ability of compensatory mitigation to replace lost aquatic resource functions may be improved if permits "established clear mitigation goals with measurable performance standards."[226] In 2002, the Corps issued guidance encouraging the districts to incorporate written and clear performance standards into permits and mitigation plans.[227] However, "districts still lack direction on how those clear standards should be constructed."[228]

Performance standards can be stated in terms of a wide array of goals, structures, and functions. Although banks should be required to meet all of the requirements in the permits and mitigation plans, meeting administrative performance standards (e.g. securing financial assurances, submitting monitoring reports) does not suffice for achieving ecological milestones. Ecological performance standards may include biotic or abiotic parameters. Biotic performance standards could include measures of plant density, cover by native or non-native invasive species, aquatic invertebrate diversity, and composition of fish assemblages. Abiotic parameters may include measures such as soil conditions, hydrologic criteria, and nutrient thresholds. The peer-reviewed literature includes significant information on a number of the biotic and abiotic parameters that might be adapted for performance standards.[229] However, there are currently no national guidelines or models for developing ecological performance standards.

Few of the banks reviewed in ELI's 2002 study included performance standards for wildlife. The wildlife standards that were included primarily focus on waterfowl, shorebirds, and indicator bird species, as well as threatened and endangered species.[230] Rather than measuring wildlife directly, wildlife standards are generally measured qualitatively by assessing "evidence of use."[231]

State wildlife agencies can play a lead role in working with the MBRT to support the design of performance standards for wildlife criteria – particularly those that address the needs of the wetland species likely to be present at the mitigation site and that are listed as species of concern in the state wildlife action plan. The development of science-based wildlife performance standards is perhaps one of the greatest opportunities to advance the state wildlife action plan through wetland mitigation banking. Having well designed ecological performance standards in place may improve the likelihood of bank success, lead to adequate remedial actions if wildlife standards are not being met, and delay the release of credits until such standards are met.

Conservation Banks

The U.S. Fish and Wildlife Service's conservation banking guidance defines a conservation bank as "a parcel of land containing natural resource values that are conserved and managed in perpetuity … for specified listed species."[232] Thus, like wetland mitigation banks, endangered species conservation banks are intended to be secured in perpetuity. In some circumstances, however, a proposed bank site may be divided into discrete segments and implemented in phases. Each segment is supposed to be capable of functioning effectively whether or not other segments are subsequently added to it. Before the first credit is sold in any bank (or in any phase of a bank with multiple phases) the land in the bank (or relevant phase of the bank) must be permanently protected through a conservation easement or transfer of fee title. Thus, phasing can facilitate financing of a bank and hedge against economic risk. That is, hedging may allow a bank to generate sufficient revenue from the sale of credits from the first phase to finance subsequent phases of the bank.

[226] Martin, Steve, Robert Brumbaugh, and Palmer Hough. March-April 2005. "Conceptualizing Mitigation Performance Standards." National Wetlands Newsletter. 27(2): 7-10.

[227] RGL 02-2 (2002), § 3, E.

[228] Martin, Steve, Robert Brumbaugh, and Palmer Hough. March-April 2005. "Conceptualizing Mitigation Performance Standards." National Wetlands Newsletter. 27(2): 7-10.

[229] For a review of this literature, see: Environmental Law Institute. April 2004. Measuring Mitigation: A Review of the Science for Compensatory Mitigation Performance Standards. Washington, DC: Environmental Law Institute.

[230] Banks and Fees (2002), p. 73.

[231] Breaux, A. and F. Serefiddin. 1999. "Validity of Performance Criteria and a Tentative Model for Regulatory Use in Compensatory Wetland Mitigation Permitting." Environmental Management. 24(3): 327-336.

[232] Guidance on Conservation Banks (2003), § part I.B.1. Emphasis added.

The other noteworthy aspect of the above definition is that it clearly contemplates management of the land in a conservation bank. That is because many endangered species require active management of their habitats (e.g., prescribed burning, control of exotic vegetation, etc.) to ensure that those habitats are to continue to be occupied by the species. That is, occupied endangered species habitat, if left unmanaged, may cease to be occupied. For many endangered species habitats, particularly those dependent upon frequent fire or other disturbance, recurrent disturbance through active management may be a necessity. Long-term management of conservation bank sites thus becomes a vitally important aspect of these banks.

Where the number of credits in a conservation bank is based on the success of efforts to increase the population of the target species (as in the red-cockaded woodpecker and Utah prairie dog banks discussed earlier), there would not appear to be as much need to prescribe management requirements at the outset. Giving the banker in such situations the flexibility to pursue population goals with whatever management measures he thinks are most likely to succeed makes abundant sense, since credits are only earned if those measures succeed.

Although, as noted above, the Service's conservation banking guidance requires that banks be protected in perpetuity, the Service has also been exploring somewhat analogous, non-permanent banking arrangements that it calls "recovery credit systems." The prototype for these is an effort around Fort Hood army base in Texas that has been encouraged by the Service, but that does not yet have its final blessing. This effort contemplates the generation of credits from non-permanent conservation commitments made by nearby landowners and the use of those credits to offset non-permanent impacts of certain activities on Fort Hood. It also allows for the generation of credits from permanent conservation commitments that can be used to compensate for permanent losses of habitat on Fort Hood.

The rationale for requiring permanent protection of wetland mitigation banks is that they compensate for wetland losses that are virtually always permanent. Regulated impacts to endangered species habitats, however, do not always entail permanent loss of that habitat. Moreover, some endangered species habitats (e.g., for the black-capped vireo, Karner blue butterfly, and bog turtle) are early successional or transitory habitats, and thus, they are, by their very nature, impermanent and are capable of being repeatedly recreated through natural (or management induced) disturbance. One of the peculiarities of the Endangered Species Act is that the legality or illegality of an action may turn on whether the habitat it affects is actually occupied by a listed species at the time of the action. Thus, an action that affects an early successional habitat that is occupied, for example, by the black-capped vireo, may require mitigation under the Endangered Species Act, whereas the same action, if carried out in the same place a decade later after the habitat has matured and is no longer occupied by the vireo, may not. Given that the effects of some regulated actions on endangered species habitats are impermanent, and that some endangered species habitats are themselves impermanent, the apparent willingness of the U.S. Fish and Wildlife Service to reconsider its current requirement that credits available to compensate for impacts to endangered species must be based on permanently protected lands is understandable. An alternative approach that has been utilized in California addresses temporary impacts by using "discounted" mitigation ratios, but still requires permanent protection of some habitat to offset the temporal loss of other habitat.

For now, however, the policy of the Service is that lands included in conservation banks must be protected in perpetuity through some legally binding mechanism. For state wildlife action plans that seek to secure high priority areas for permanent protection, conservation banking thus offers a mechanism to further that objective that is ultimately funded by the proponents of development projects that detrimentally affect similar, but less critically important, habitats elsewhere.

Balancing Conservation and Economic Objectives: Establishing Bank Service Areas

Wetland Mitigation Banks

A bank's service area is "the designated area (e.g., watershed, county) wherein a bank can reasonably be expected to provide appropriate compensation for

impacts to wetlands and/or other aquatic resources."[233] The service area is generally spelled out in the banking instrument. Federal guidance suggests that designation of the service area should be guided by one of two classification systems: Hydrologic Unit Codes, which are watershed boundaries developed by the U.S. Geological Survey, or ecoregional maps adopted by EPA or the U.S. Department of Agriculture.[234] Although a bank's service area should "be based on consideration of hydrologic and biotic criteria," the guidance states that other state or regional classification systems may be used.[235] Banks can be used to offset impacts beyond their service area boundaries on a case-by-case basis.

ELI's 2002 study found that of the 195 banking instruments that include information on geographic service areas, 53 percent are based on watersheds, 22 percent on county boundaries, 11 percent on other hydrologic units, and 14 percent on other criteria.[236] Service areas vary significantly by state, region, and Corps district, and watersheds themselves can vary widely in area and can be defined in different ways and at different scales. For example, all of banks reviewed in the Chicago Corps district are principally available only for use for impacts within the watershed where the bank is located.[237] Alternatively, the Wisconsin Waterfowl Association Banking Instrument states that the bank service area is the entire state of Wisconsin.[238] Several states, such as New Hampshire and Connecticut, have delineated relatively small service areas. New Hampshire, which is only 8,986 square miles, has delineated 110 service areas. In contrast, the service area for the Mile High Wetland Bank in Colorado includes eight counties and approximately 10,000 square miles. [239] In some parts of the country, such as New England, small service areas, coupled with limited demand for mitigation credits due to a low volume of permitted impacts, may create low demand for wetland mitigation banks.

One concern about bank service areas is that MBRTs may be under pressure from wetland mitigation bankers – public and private – to establish service areas that are much larger than is desirable to replace the localized functions and services that the regulatory program is intended to protect. Larger service areas may create greater demand for a bank's available credits, but also serve to encourage the migration of lost aquatic resource functions and services further away from the impact site. It is the duty of the Corps and the MBRT to achieve the overarching objectives of the program, namely no net loss of wetland functions and acres. As long as the compensation being providing is sustainable and ecologically effective, how that mitigation is delivered – through permittee-responsible mitigation, a bank, or an in-lieu fee program, should be of little importance. The regulatory agencies should not be bound to deliver specific functions or services for a particular interest group. Nor should they be compelled to deliver credits to ensure the economic viability of banks or other mitigation mechanisms.

One opportunity for integrating the state wildlife action plans with wetland mitigation banking lies in identifying appropriate bank service areas. The federal guidance states that "bank service areas may encompass larger watershed areas if the designation of such areas is supported by local or regional management plans (e.g., Special Area Management Plans, Advance Identification), State Wetland Conservation Plans or other Federally sponsored or recognized resource management plans."[240] As federally recognized resource

[233] Banking Guidance (1995).

[234] Banking Guidance (1995), § II, D, 3.

[235] Banking Guidance (1995), § II, D, 3.

[236] Banks and Fees (2002), pp. 46-48.

[237] The agreement also states that credits may be debited outside of the bank's watershed on a case-by-case basis. Army Corps of Engineers, Chicago District. Interagency Coordination Agreement on Wetland Mitigation Banking. Chicago: 1997. pp. 7-8.

[238] Wisconsin Waterfowl Associates Wetland Mitigation Group, LLC. Wisconsin Waterfowl Associates Wetland Mitigation Bank Prospectus and Operating Agreement for the Walkerwin Wetland Bank Site. Banking Instrument. Colombia County, WI. 1996. 11. (Wisconsin has passed new regulations requiring that wetland mitigation banks established after February 1, 2002 must have defined service areas and mitigation cannot be applied statewide. Wis. Admin. Code §350.03.)

[239] Mile High Wetlands Group. Mile High Wetland Bank Prospectus Document, Final. Banking Instrument. Brighton County, CO. 1999; U.S. Census Bureau State and County Quick Facts, Colorado See: http://quickfacts.census.gov/qfd/maps/colorado_map.html. 1 May 2002; U.S. Census Bureau State and County Quick Facts, New Hampshire. See: http://quickfacts.census.gov/qfd/states/33000.html. 1 May 2002.

[240] Banking Guidance (1995), § II, D, 3.

management plans, the state wildlife action plans may be a solid foundation for the identification of service areas that support the needs of critical wildlife species.

Conservation Banks

Like wetland mitigation banks, endangered species conservation banks can sell or use their credits only within specified "service areas." The specification of a service area has enormous practical consequences for a bank, the economic viability of which is likely to be directly related to the size of the service area in which its credits can be used. As noted above in the discussion of the characterization and quantification of credits, compensatory mitigation decisions under the Clean Water Act and the Endangered Species Act have rather different goals, and these differences translate into rather different perspectives on how service areas should be delineated.

The goal of compensatory mitigation decisions under the Clean Water Act is to achieve no net loss of wetland function and values. Some of these wetland "functions and values" are highly localized. For example, the floodwater attenuation value of any particular wetland applies only in the watershed where the wetland occurs. Put differently, loss of floodwater attenuation in one watershed is not offset by increasing floodwater attenuation in a different watershed. As a result, the service areas for wetland mitigation banks are generally the same watershed within which the bank is located.

In contrast, the Endangered Species Act is not necessarily concerned with localized values. Its goal is to prevent the extinction and secure the long-term survival of the species it protects. Except for narrowly endemic species, this goal can often be achieved by securing viable populations of the species in any of several different areas. Recovery plans for listed species often delineate several geographically distinct "recovery units" and set population objectives for each unit. The Service's banking guidance provides that these plan-designated recovery units should generally serve as the service areas for conservation banks located within such units.

The Service's guidance recognizes a couple of exceptions to this general rule, however. First, once the recovery objectives for a particular recovery unit have been achieved, projects located within that unit should be able to buy or use credits from banks in other recovery units where recovery objectives have not yet been met. This follows logically from the fact that the goal of the Endangered Species Act is not to perpetuate all local occurrences of a species, but to ensure its well-being in enough areas to secure its long-term survival, even if it ceases to occur in other areas. A second exception concerns development projects that adversely impact a listed species outside of any designated recovery units (the fact that not all occurrences of a species lie within recovery units clearly reflects the conclusion that not all current occurrences are necessary to the survival of the species). According to the guidance, the impacts of these projects can be offset with credits from any bank in a recovery unit.

The Service's guidance on conservation banking thus adopts a more flexible and less restrictive approach to service areas than the approach under the Clean Water Act. The actual practice of the Service has sometimes been even more flexible than its written guidance suggests. For example, the conservation bank for the Utah prairie dog operated by the Utah School and Institutional Trust Lands Administration is located in the recovery unit that is furthest from achieving its recovery goals, but is allowed to sell its credits in another recovery unit that is much closer to achieving its recovery goals. In addition, the service area for the Hickory Pass Ranch conservation bank in Texas encompassed parts of several different recovery units for the black-capped vireo. The flexibility that is possible in delineating the service areas for endangered species conservation banks thus gives states an opportunity to influence the location of those service areas so as to complement the goals of state wildlife action plans.

When Things Go Wrong: Anticipating Possible Problems

There is a rather long history of mitigation actions that fail to accomplish their intended purposes. In traditional, project-by-project mitigation, the realization that mitigation measures have failed often comes too late to do much about it. The developer of a new subdivision, for example, may have moved on, leaving the homeowners' association with the ownership of and responsibility for managing the wetland that was

created to compensate for the originally impacted wetlands. Typically in such situations, the homeowners' association lacks both the technical knowledge and the resources (much less the legal liability) to rectify the failure of the mitigation wetland.

One of the claimed advantages of banking (whether wetland mitigation banking or endangered species conservation banking) is that it provides a better mechanism for rectifying mitigation failures. Two features of banking underlie this claim. First, the sale of credits transfers the liability for implementing mitigation from a developer, who may have no long term interest in the site, to a banker who is obligated to conserve and manage the mitigation site in perpetuity. Second, the banking agreement, the basic legal charter governing the establishment and operation of the bank, is a vehicle through which the banker's obligation to take remedial action can be explicitly addressed.

In addition, wetland mitigation banks are performance based. With the exception of the initial credits that are released when the site is secured, the banking instrument is signed, and the financial assurances are in place, additional credits may not be released for sale until performance standards are met. Of course, if the performance standards are weak or not substantively tied to meeting the objectives of the bank, then even if the bank achieves the standards it could still be an ecologically ineffective and unsustainable bank for wildlife habitat and other functions.

The U.S. Fish and Wildlife Service's conservation banking guidance provides that banking agreements are to stipulate "procedures for identifying, implementing, and funding remedial measures at a bank in the event of unexpected contingencies."[241] In addition, the agreement must include "a method for disposal of the property to a third party capable of continuing the management of the property for species protection in the event of the current owners [sic] inability to continue the operation of the bank for any reason."[242] Banks that had been established prior to the issuance of such guidance in 2003 had not always been required to anticipate such failures, an oversight that became painfully evident to both the Service and the California Department of Fish and Game.

Less than a year following the issuance of the Service's guidance, The Environmental Trust, a non-profit organization that owned or managed at least 80 mitigation properties in San Diego County (including about a dozen that were established as conservation banks), laid off most of its personnel and essentially closed due to a lack of funds. By the following year, it had filed for bankruptcy. Management endowments had been established for the properties in its portfolio, but The Environmental Trust underestimated the costs of management and overestimated the returns that would be generated from investing its endowment funds. The U.S. Fish and Wildlife Service and the California Department of Fish and Game were not willing to renegotiate the Trust's management obligations, San Diego County was unwilling to take over the properties, and other non-profit organizations were unwilling to accept a transfer of the properties. The restrictions imposed by the conservation easements made the properties essentially without value for commercial buyers. Deeply in debt and unable to carry out its management obligations, The Environmental Trust turned to the bankruptcy court to resolve the future of the properties. The contingency that the Trust might go out of business had simply not been addressed when it accepted mitigation properties.

It should be emphasized that the perils for conservation exemplified by the Trust's experience are not unique to banking. Indeed, most of the properties in the Trust's portfolio were not bank properties. Instead, most of them were parcels that were preserved to satisfy mitigation obligations imposed on a project-by-project basis. The agencies that imposed these mitigation obligations (which in this instance were primarily agencies of the City and County of San Diego) chose to let a non-profit third party assume the responsibility for managing the parcels rather than take on that responsibility themselves. Moreover, they transferred liability without specifying how the parcels would be managed if The Environmental Trust proved unable to fulfill its obligations. The Service's banking guidance suggests that such contingencies be specifically addressed in future banking agreements. No comparable requirement has yet been announced for other, non-bank mitigation properties.

[241] Guidance on Conservation Banks (2003), § II, D, 3.

[242] Guidance on Conservation Banks (2003), § II, D, 3.

Funds Potentially Available for Wetland and Conservation Banking

In 2007, ELI issued a report examining the federal programs that require monetary or in-kind compensation for impacts to wildlife habitat and the environment.[243] The report examined the federal regulatory programs that: (1) prospectively issue permits or licenses for activities that affect wildlife habitat or other natural resources; or (2) assess after-the-fact damages for injury to, destruction of, or loss of habitat or natural resources. Although the limitations were significant, the report draws from available data to estimate, for the first time, an annualized dollar amount of the mitigation of wildlife habitat and the environment that are captured under the major federal programs. The programs reviewed were §404 of the Clean Water Act, §10 of the federal Endangered Species Act, federal natural resource damage programs, the Federal Power Act, and the Northwest Power Act (see Table 3).

Table 3. Estimated Annual Compensatory Mitigation Costs Expended or Committed Under Major Federal Regulatory Programs

Regulatory Program or Authority	Cost Estimate (in millions)
Clean Water Act §404	$2,947.3
Endangered Species Act §10	$370.3
Federal Natural Resource Damage Programs	$87.7
Federal Power Act	$210.3
Northwest Power Act	$207.1
Total:	***$3,822.7***

ELI estimates that the annualized cost of compensatory mitigation conducted under these key federal programs nationwide is approximately $3.8 billion. Over $2.9 billion of this – over 77 percent of the estimated annual amount of funds spent on compensatory mitigation – is generated through the mitigation requirements of §404 of the Clean Water Act. As a result, any efforts to direct mitigation monies toward protecting the critical wildlife habitat identified in the state wildlife action plans would most effectively focus on the §404 program. Section 404 is, however, driven by its own statutory requirements and programmatic goals, which must be taken into account when considering whether and how these funds could be strategically directed for wildlife conservation purposes.

The two statutes under consideration for the purposes of this report – §404 of the Clean Water Act and the Endangered Species Act – are discussed further below.

- Section 404 of the Clean Water Act/$2.9 billion in FY 2003. ELI's dollar estimate for §404 compensatory mitigation considers both wetland and stream mitigation. With respect to wetland compensation, the figures were aggregated from disparate data that reflect the inherent variability in mitigation costs due to regional location, the mitigation mechanism (permittee or third-party), and the different methods of mitigation used (such as creation, restoration, enhancement and preservation). The available data for stream compensation are less detailed and do not account fully for these kinds of variables.

  Working within these data constraints, and using FY 2003 as a baseline, ELI's initial aggregate estimate of wetland mitigation costs across all regions of the country ranged between $2.5 billion and $4.4 billion, with a likely midpoint of approximately $3.4 billion. Adjusting these estimates to account for the probable mix of different mitigation methods used then reduced the bottom-line range to approximately $1.7 billion to $3.1 billion, with a mid-range estimate of about $2.4 billion. ELI further estimates that the total FY 2003 cost of stream mitigation was between $179 million and $955 million, with a likely mid-point of around $573 million.

  Combining the two estimates for wetland and stream mitigation suggests that the total amount spent on aquatic resource mitigation under §404 of the CWA in FY 2003 was between $1.9 billion and $4.0 billion, with a probable midpoint of around $2.95 billion. As indicated, all of these estimates are based on specified assumptions and extrapolations from incomplete data, and should be viewed in that context. There is significant need for addi-

[243] Environmental Law Institute. October 2007. Mitigation of Impacts to Fish and Wildlife Habitat: Estimating Costs and Identifying Opportunities. Washington, DC: Environmental Law Institute.

tional, reliable data that will enable a more full and accurate estimate of the total cost of aquatic resource mitigation.

- Endangered Species Act/$370.3 million committed annually between 2003 and 2006. The Endangered Species Act includes two sections that may require compensatory mitigation for impacts to the habitat of listed (threatened or endangered) species. Under ESA §7, all federal agencies are required to consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service (the Services) to ensure that any activities funded, authorized, licensed, or permitted by the agency will not jeopardize a species listed under the Act or adversely affect designated critical habitat for listed species. These consultations may result in mitigation requirements to compensate for allowed impacts.

  Additionally, under ESA §10, non-federal entities may receive a permit from the Services for the "take" of listed species, provided that the take is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."[244] These incidental take permits and their associated habitat conservation plans require that permittees minimize and mitigate their impacts to listed species and habitat "to the maximum extent practicable."[245]

  There are no specific data available for mitigation expenditures that may occur as part of the vast scope of ESA §7 consultations. Data on mitigation costs associated with §10 habitat conservation plans and incidental take permits (HCP/ITPs) are available and more thorough, but they are not complete. ELI's estimate for the annualized commitment of funds to compensatory mitigation under ESA is based on an examination of the 65 HCP/ITPs approved by FWS in the years 2003 through 2006. These HCP/ITPs required permittees to commit a total of $1,481,345,433 in mitigation expenditures over the duration of the HCP/ITPs, for an average long-term commitment of $370.3 million per year.

Any question as to why wetland mitigation banking and conservation banking are or should be viewed as valuable conservation tools for achieving the habitat conservation objectives of the state wildlife action plans can be answered simply. Annually, almost 14,000 acres of land is preserved in perpetuity through wetland mitigation banking. In the area under the jurisdiction of the Sacramento field office of the U.S. Fish and Wildlife Service, there are nearly 17,000 acres in currently approved conservation banks, nearly 12,000 acres in conservation banks that have sold all their credits, and over 3,000 acres in banks currently awaiting approval. And over $3.3 billion dollars are spent on wetland mitigation and conservation banking every year. Harnessing these funds to protect the critical wildlife habitat identified in the state wildlife action plans would help significantly support the state's conservation goals.

[244] 16 U.S.C. § 1539(a)(1)(B).

[245] 16 U.S.C. § 1539(a)(2)(B).

Conclusions

This report concludes by offering state wildlife planners, state habitat banking program managers, and other decision-makers a concrete set of recommendations on how to utilize existing habitat banking programs, establish new habitat banks under existing authorities, or launch new habitat banking systems that will support the protection of critical wildlife habitat identified in the state wildlife action plans. General recommendations for advancing the use of banking for wildlife conservation purposes are also outlined below.

Recommendations for Existing Habitat Banking Programs

The most immediate opportunities for harnessing habitat banking to support the conservation objectives of the state wildlife action plans are through the two existing programs – wetland mitigation banking and conservation banking. Since together, these two banking programs represent considerable annual investments in the conservation of habitat, they warrant particular attention.

Wetland Mitigation Banks

Wetland mitigation banking under §404 of the Clean Water Act offers a variety of ways to support the conservation of priority wildlife habitat identified in state wildlife action plans. These include at least the following: (1) siting and designing banks to protect critical wildlife habitat; (2) managing banks to protect critical wildlife habitat; and (3) incorporating the goals of the wildlife action plans into the watershed approach to compensatory mitigation decision-making.

Guide wetland mitigation bank siting and design

Ultimately, decisions about where to site and how to design wetland mitigation banks rest with the bank sponsor. The federal and state agencies that serve on the MBRT have limited ability to direct these decisions. However, the process for seeking mitigation bank approval may involve opportunities for the bank sponsor to interact with the MBRT and solicit feedback on the location and design of the proposed bank. These early interactions present opportunities for the MBRT to take into account critical wildlife habitat and species of greatest conservation concern.

Sponsors are encouraged to meet with the MBRT for a pre-application consultation in advance of submitting a draft mitigation banking instrument.[246] Prospective bank sponsors are then encouraged to submit a bank "prospectus."[247] Only after addressing the agencies' feedback on the prospectus does the bank sponsor submit a mitigation banking instrument, which includes the mitigation plan. The bank instrument may go through one or more iterations before it is finalized.

This process offers several opportunities for the Corps and the MBRT to offer comment on proposed bank siting and design. Concerns about the bank's ability to replace lost aquatic resource functions and provide sustainable compensation can be voiced early on; giving the bank sponsor the opportunity to adjust the proposed project. In addition, during the process the MBRT gives the bank sponsor a general sense of the number of credits the bank is likely to yield as designed. The MBRT may afford additional credits to banks that propose to provide significant wildlife functions.

MBRTs and Corps districts could incorporate criteria from the state wildlife action plans into the bank review process. Many Corps districts provide prospective bank sponsors with checklists or other documents in advance of each approval stage. These checklists detail the type and amount of information that the sponsor must provide the MBRT. At the same time, it reveals how the proposal will be evaluated by the MBRT. The Corps' Mobile District has developed an "Initial Review Check List" that provides applicants with a clear idea of the information that must be provided to the MBRT in advance of the pre-application coordination meeting. The Mobile District requests applicants to provide a narrative overview of the project describing how the resulting increase in ecological value at the site will improve conditions in the regional watershed (or proposed mitigation service area).[248] At least four districts – the Jacksonville, Mobile, Omaha,

[246] RGL 02-2 (2002), § 3.

[247] Banking Guidance (1995), § II, C.

[248] U.S. Army Corps of Engineers, Mobile District. Undated. Initial Review Checklist. https://samribits.sam.usace.army.mil/ribits/pdfs/Bank%20Establishment%20Process.pdf.

and Savannah Districts – provide bank sponsors with checklists for use during development of the bank prospectus. At least one state and eight Corps districts – the Michigan Department of Environmental Quality and the Baltimore, Mobile, Norfolk, Omaha, Portland, San Francisco, Savannah and Wilmington Districts – have developed mitigation banking instrument templates or checklists. References to the state wildlife action plans or specific conservation goals in the plan – i.e., restoration of specific habitat types or species – could be incorporated into such checklists or templates.

Finally, it within the discretion of individual states whether or not the state wildlife agency plays a lead role on the MBRT, but the more involved the agency is, the more leverage it will have to provide bank sponsors with feedback on the location and design of proposed banks and to ensure that the bank takes key wildlife habitat and species of greatest conservation concern into account.

Influence wetland mitigation bank management

Performance standards – the measurable outcomes of wetland compensatory mitigation projects – play a key role in the design and management of wetland mitigation banks. A bank's monitoring requirements, credit release schedule, and financial assurances are often tied to meeting performance standards. As discussed earlier (see Chapter 4, "Duration and Character of Management at Bank Sites"), performance standards are often not based on current science, are not clearly written, and may not be based on factors that are relevant to the wildlife species and critical wildlife habitat identified in the state wildlife action plans.

State wildlife agencies can play a lead role in working with the MBRT to support the design of performance standards for wildlife criteria, particularly those that address the needs of the wetland species present at the mitigation site that are listed as species of concern in the state wildlife action plan. The development of science-based wildlife performance standards is perhaps one of the greatest opportunities to advance the state wildlife action plan through wetland mitigation banking. Having the right ecological performance standards in place may improve the likelihood of bank success, lead to adequate remedial actions if wildlife standards are not being met, and delay the release of credits until such standards are met.

Incorporate the goals of the state wildlife action plans into the watershed approach

A shift in federal policy on how bank siting decisions are made may help to increase the number of banks located on properties identified as critical wildlife habitat. In 2001, the National Research Council's Committee on Mitigating Wetland Losses recommended that the federal wetland mitigation program adopt a watershed approach to identifying sites for mitigation, including mitigation banks. NRC indicated that doing so would improve the ecological success of all mitigation. This recommendation has been embraced by the agencies and in 2002 the Corps issued guidance in support of the watershed approach.[249] Draft compensatory mitigation regulations issued jointly by EPA and the Corps in 2006 may codify the approach.[250] The agencies are likely to issue further guidance on the watershed approach upon finalization of the proposed rule.

Under the watershed approach outlined in the proposed mitigation rule, there are many opportunities for wetland mitigation banking to support the habitat conservation objectives of the state wildlife action plans. The proposed rule states that compensatory mitigation should consider, among other things, "habitat requirements of important species…, as well as the requirements of other regulatory and non-regulatory programs that affect the watershed, such as…habitat conservation programs."[251] The state wildlife action plans can be a solid basis for the habitat analysis. The proposed rule also describes the type of watershed information that should be utilized in watershed-based decision-making, including "the presence and needs of sensitive species,"[252] and suggests that this information may be contained in existing plans. The state wildlife action plans can be an excellent source for information on the presence and needs of sensitive species. Finally, the proposed rule states that a watershed approach involves taking consideration of state interests "including the requirements of other programs and objectives,

[249] RGL-02-2 (2002).

[250] Proposed Compensatory Mitigation Rule (2006).

[251] Proposed Compensatory Mitigation Rule (2006), § 332.3, c, 2, i.

[252] Proposed Compensatory Mitigation Rule (2006), § 332.3, c, 3.

such as habitat conservation…"[253] The state wildlife action plans could be a sound basis for incorporating state wildlife objectives into compensatory mitigation decision-making.

Relying upon the watershed approach to guide selection of bank sites can help contribute to maintaining habitat diversity and connectivity and the appropriate proportions of habitat types needed to enhance the long-term stability of the priority wildlife habitat identified in the state wildlife action plans.

Conservation Banks

Conservation banking can support the conservation of priority habitats in state wildlife action plans by influencing the siting and management of conservation banks established pursuant to the Endangered Species Act.

Influence the siting and management of banks established pursuant to the Endangered Species Act

Although the ultimate responsibility for approving conservation banks under the Endangered Species Act rests with a federal agency,[254] states can be influential in affecting both the siting and management of such banks. To the extent that there is overlap between areas identified in state plans as conservation priorities, and areas that support – or may be capable of supporting – federally listed species, banking offers an opportunity to meet federal regulatory requirements while concurrently advancing state conservation objectives. As noted elsewhere, most endangered species conservation banks established to date are "preservation banks." That is, they are banks established to preserve existing resource values. Banking thus offers a means of bringing ecologically significant sites into conservation ownership, without the need to spend public funds. The cost of bringing such areas into conservation ownership is borne by the purchasers of credits from the bank, who are typically private sector development interests.

The opportunities available to states are greatest when, in addition to the requirements of the Endangered Species Act, there are state regulatory requirements that can be met through the sale of credits from a bank. In these cases, it is clear that the U.S. Fish and Wildlife Service's banking guidance contemplates that states will be invited to participate in the development of banking agreements and to serve on the bank review team, which oversees the establishment, use, and operation of a bank. However, even if a state does not have regulatory requirements of its own that are to be met though the use of bank credits, states can work informally with their federal counterparts to identify areas where banks would be particularly useful. States can also work with their federal counterparts to ensure that crediting methodologies and management plans for banks take into account state expertise and objectives. In addition, if the banker is a state agency such as a highway department, the state fish and wildlife agency should have opportunities to influence its sister agency's choice of bank locations.

One must acknowledge, however, that there are limits to how much influence states can have over the siting and management of federally approved conservation banks. If priority habitats identified in state wildlife action plans do not support federally listed species, or if there is no development pressure stimulating demand for credits associated with the listed species that they do support, there will be no opportunity to use federal conservation banks as a way of protecting those priority habitats. Even when state priority habitats do support federally listed species for which there is development-driven demand for credits, bankers may choose to establish their banks at other sites, since ultimately the choice of where to site a bank is made by the banker. Neither the states nor the federal agencies can require that a privately initiated bank be sited at a particular location. At most, through their development of a crediting methodology and their ability to require certain management practices, they can hope to influence a banker's selection of a bank site.

[253] Proposed Compensatory Mitigation Rule (2006), § 332.3, c, 2, i.

[254] To date, that agency has always been the U.S. Fish and Wildlife Service, but NOAA Fisheries can also approve conservation banks if they cover species over which NOAA has jurisdiction.

Recommendations for Creating New Habitat Banks Under Existing Authorities

There are several opportunities for states to establish new habitat banks or habitat banking programs that could contribute to the conservation of priority wildlife habitat identified in the state wildlife action plans under existing regulatory mechanisms that already require compensation for impacts to the environment. Appendix I lays out a set of effective banking practices that should guide any habitat banking program to ensure that the mitigation provided is sustainable and ecologically effective. Banking can support the protection of priority wildlife habitat through: (1) establishment of state-sponsored banks; (2) creation of incentives for banks to be sited in priority conservation areas; and (3) creation of new banking programs that utilize existing authorities.

Establish state-managed banks in priority conservation areas

If the state itself becomes a banker, then, like any other banker, it decides the location of its bank. Thus, through establishing their own banks, states may be able to leverage funds from private development interests (or from state agencies such as highway departments) to acquire and manage areas that are conservation priorities in state wildlife action plans. In effect, banking can enable states to steer mitigation dollars toward state priority conservation areas. State wildlife agencies may also be able to work with their landowning sister agencies to establish banks on state lands not currently being managed for conservation purposes.

For example, North Carolina's Ecosystem Enhancement Program (NCEEP) is considered a national model of a state-sponsored compensatory mitigation program. The North Carolina Department of Environment and Natural Resources and the North Carolina Department of Transportation (NCDOT) established and administer the NCEEP. NCEEP accepts payments in advance of permitted impacts and operates as a quasi banking/in-lieu fee program. One portion of NCEEP conducts mitigation exclusively for impacts resulting from NCDOT activities. NCDOT provides NCEEP with information on its anticipated mitigation needs; NCEEP provides NCDOT with an estimate of the costs it anticipates incurring to offset the impacts; and NCDOT provides funds for NCEEP to carry out mitigation activities.

The cornerstone of the NCEEP is a detailed watershed-planning process that is designed to support high-quality, cost-effective projects for watershed improvement and protection and open space preservation. NCEEP develops River Basin Restoration Priorities, which include the identification of Targeted Local Watersheds. NCEEP currently delivers an estimated 80 to 90 percent of all of the state's required mitigation. Most of the program's funding is generated through the agreement with NCDOT, which averages approximately $95 million annually.

Another example is the conservation bank for the Utah prairie dog. In this case, Utah's school land trust agency, the State and Institutional Trust Land Administration (SITLA), already owned extensive lands that it managed to generate income for state schools. Its trust responsibilities precluded it from simply dedicating these lands for non-income-generating conservation purposes. However, working with the Utah Division of Wildlife, SITLA identified a portion of its land that it was willing to allow the Division to manage for prairie dog conservation purposes. In return for encumbering those lands with a conservation easement, SITLA earned credits to sell to private developers in rapidly growing Iron County. Thus, by establishing a conservation bank on some of its lands, SITLA could both devote the land to conservation and fulfill its legal duty to generate income from its land for the benefit of the state's schools. Although this bank (like nearly all conservation banks) was completed before the state had a wildlife action plan, the development of state wildlife action plans provides added reason for many states in the West to look for similar opportunities to improve conservation practices on school trust lands through the establishment of banks.

There are, of course, limits to the ability of states to acquire conservation priority areas by establishing banks on them. First, depending on the details of state law, state conservation agencies may lack the legal authority to establish banks or sell credits from them. Thus, in the case of conservation banks, any state wildlife agency contemplating the possibility of establishing a conservation bank should seek legal advice from

the state Attorney General's office as to the extent of its authority. However, even if a state agency clearly has the authority to establish a conservation bank, its priority conservation areas may not support federally listed species, or may not support those species for which there is credit demand from development interests.

There is another consideration that states should weigh carefully before venturing into the business of establishing wetland and conservation banks. The entry of states into the banking business may discourage private entrepreneurial investment in banking. Private wetland and conservation bankers often view government-sponsored banks as unfair competition that can underprice their credits precisely because they are taxpayer subsidized and do not need to generate profits to remain in business. This concern is somewhat less applicable to state-sponsored banks that are intended to supply the future mitigation needs of only the sponsoring agency itself (such as banks established by state highway departments to compensate for the effects of future highway projects). Nevertheless, before a state decides to establish a bank, it should at least consider the likely impact of that decision on the willingness of private investors to invest in banking. It should do so not because states have any special obligation toward those private investors, but because the goal of advancing the state's conservation objectives may be better served by encouraging private investors to enter the banking business than by discouraging them from doing so.

Create incentives for banks to be sited in priority conservation areas

Many existing state laws impose regulatory requirements to provide compensatory mitigation for impacts from certain development activities. Whenever any state environmental law imposes compensatory mitigation obligations, the potential to meet those obligations through banking exists. Since the state itself will design the rules for banking pursuant to the state's own laws, the state can ensure that those rules further the conservation priorities of its state wildlife action plans.

There are a variety of ways in which a state might do this. For example, a state might allow certain wetland or conservation banks to be established only in areas designated as priority conservation areas in the state plan. Alternatively, a state might allow the siting of banks anywhere, but reward those sited in priority conservation areas by giving extra credit for banks sited in such areas. That same crediting methodology could also discourage development in conservation priority areas by requiring developments there to be offset with more credits than would be required of a comparable development elsewhere.

Create new banking programs as a means of complying with existing state regulatory requirements

The discussion thus far has focused on how states might influence or participate in habitat banking activities carried out pursuant to the federal §404 Clean Water Act and Endangered Species Act. The fact should not be overlooked, however, that the state that has made the most aggressive use of conservation banking, California, did so initially as a way of fostering compliance with its own regulatory requirements imposed by the California Endangered Species Act and the California Environmental Quality Act. Such provisions are available in many states. Virtually every state has a state endangered species law, fifteen states have enacted environmental policy acts,[255] and many states have enacted wetland or stream protection provisions. Although the details of these state laws vary from state to state, many of them impose regulatory requirements that include a duty to mitigate the impacts of certain development activities.

Whenever any state environmental law imposes compensatory mitigation obligations, the potential to meet those obligations through banking exists. And since the state itself will design the rules for banking pursuant to the state's own laws, the state can ensure that those rules further the conservation priorities of its state wildlife action plans.

For example, California's Environmental Quality Act requires state and local agencies to identify the sig-

[255] The District of Columbia and Puerto Rico also have state environmental policy acts modeled after the National Environmental Policy Act. Sive, David and Mark A. Chertok. June 2005. "Little NEPAs" and their Environmental Impact Assessment Procedures. Sive, Paget & Riesel, P.C. Developed for ALI-ABA: Environmental Litigation Course. http://www.sprlaw.com/pdf/spr_little_nepa_ali_aba_0605.pdf.

nificant environmental impacts of their actions and to avoid or mitigate them. In 2005, a provision was adopted requiring mitigation for projects that result in the "conversion of oak woodlands that will have a significant effect on the environment." The new program allows for several mitigation alternatives, including preserving existing oak woodlands through easements, planting an equivalent number of trees, or contributing funds to an Oak Woodlands Conservation Fund that is administered by the California Fish and Game Commission. The funds may be used for a variety of purposes, including the purchase of conservation easements, land improvement grants and cost-share incentive payments, public education and outreach by local government entities, and for assistance to local governments to encourage the incorporation of oak conservation elements into local general plans.

Establishment of new banks under existing provisions could support the conservation objectives of the state wildlife action plans in a variety of ways. A state might allow certain conservation banks to be established only in areas designated as priority conservation areas in the state's wildlife action plan. Alternatively, a state might allow the siting of conservation banks anywhere, but reward those sited in priority conservation areas through the use of a crediting methodology that gives extra credit for banks sited in such areas. That same crediting methodology could also discourage development in conservation priority areas by requiring developments there to be offset with more credits than would be required of a comparable development elsewhere.

Recommendations for Creating New Habitat Banking Systems

New regulatory requirements would be necessary to support habitat banking systems that are not currently captured by existing federal or state regulatory programs. As with new banking programs, new banking systems should also rely upon the set of effective banking practices outlined in Appendix I.

Adopt laws or regulations to require compensation for currently unaddressed impacts to the environment

Impacts to the environment from land development and land use practices are widespread and frequent. Only a small fraction of those impacts, however, require compensatory activities to offset permitted damage. Federal and state wetland, endangered species, environmental assessment, and natural resource damage laws are the most common type of provisions requiring compensation for permitted impacts.

By adopting new federal and state provisions that require compensation for impacts to habitat types or species, public agencies can more effectively seek offsets for impacts that currently go unaddressed. Several new compensatory programs have been developed in recent years, largely due to the public's increased understanding of the negative cumulative effects of incremental environmental damage.

There are still other possibilities for states to develop new banking initiatives to meet plan goals. In Wyoming, for example, there is concern about the fragmentation of sage grouse habitat by an explosion of energy development and other threats. The grouse is identified as a "species of conservation need" in Wyoming's plan, but the plan itself identifies no new measures to conserve it. Concerned that the grouse might be headed toward federal listing, Wyoming's Governor asked a special advisory team to recommend actions to avert that outcome. Among the team's recommendations was that the state develop and enforce "conservation thresholds" for the grouse. These conservation thresholds would apparently take the form of population or habitat acreage targets high enough to permit continued recreational hunting while ensuring that the species remain off the endangered species list. Exactly how such thresholds would be enforced has not yet been clarified, but banking could be a useful part of any such mechanism. That is, those who secured some quantity of habitat could sell credits to energy companies, whose actions detrimentally affected habitat, thus creating a clear incentive to conserve habitat and a flexible mechanism to accomplish mitigation. Through measures such as this, states may discover that their plans can give rise to creative new conservation strategies incorporating lessons learned from the habitat banking experience.

General Recommendations

Future iterations of the state wildlife action plans or ancillary efforts can more effectively support wildlife conservation by: (1) providing greater specificity as to the location of priority habitats so as to increase the likelihood that banks will be established to conserve those habitats; (2) more fully considering the role that banking can play as a conservation action; and (3) providing information on habitat restoration opportunities.

Provide greater specificity as to the location of priority habitats

The ability of states to take advantage of many of the opportunities to support the conservation of priority habitats through banking may ultimately depend on the specificity of state plans. Our review of the first generation of those plans indicated a wide range of approaches taken by the various states (see Chapter 3, Habitat Classification Methods and Their Relationship to Wetland and Conservation Banking). Some action plans, for example, simply identify important habitat types, without ranking them relative to each other or further prioritizing within a habitat type. Other plans may rank habitat types, but not prioritize areas within a habitat type. Some plans identify where high priority habitats occur, but often at a very coarse level. Very few plans identify priority habitats with the precision that would provide clear guidance to a potential banker as to what parcels he or she should acquire to advance the state's objectives most effectively.

There appears to have been an understandable reluctance on the part of most states to be very specific in their action plans about precisely where priority habitats are located. Landowner sensitivities, potential impacts on property values, and similar concerns may have led states to articulate their conservation priorities in general rather than specific terms. Conservation banking decisions, on the other hand, are of necessity quite focused on the values and functions of particular parcels of land, both for purposes of evaluating the negative environmental impacts of development and for evaluating the environmental benefits offered by a potential bank site.

Future generations of state wildlife action plans, or ancillary efforts undertaken to supplement existing plans, may provide the more detailed information that is most useful for banking decisions. Because state wildlife action plans are so new, none of the conservation banks established to date has been influenced by them. As more states experiment with conservation banking, however, it would be instructive to evaluate how, if at all, state wildlife action plans have influenced the development of the next generation of conservation banks.

More fully consider the role that banking can play as a conservation action

Our review of the 50 state wildlife action plans revealed that only eleven state plans make any reference to habitat banking. In five of these states, the only reference to banking is relegated to the appendices and in four states the plans make only a single brief reference to banking. Future iterations of the plans should more fully explore the role that banking can play in meeting their conservation objectives.

Provide information on habitat restoration opportunities

For the state plans to effectively direct wetland mitigation banking, they should identify lands with high wetland restoration potential. Virtually all of the state wildlife action plans – 47 of the 50 plans or 94 percent – identify wetlands as a key habitat type. In addition, 37 of the 50 plans – 74 percent – include maps that identify wetland habitat. Clearly the plans recognize the significance of wetland habitat for wildlife conservation.

However, in their current iteration, the state wildlife action plans present some limitations to guiding mitigation banks to protect critical wildlife habitat identified in the plans. Most of the wetland acreage that is identified in the plans is existing, high quality wetlands that retain much of their functional capacity. Although this is valuable information for wetland habitat acquisition, these highly functional wetlands offer little opportunity to the mitigation banker to provide functional "lift" through wetland restoration. Wetland mitigation providers more generally seek to identify opportunities to restore wetland acres, as these sites will generate far more wetland credits for banking.

Few if any state wildlife action plans identify potential wetland acreage or areas with high restoration potential. Future iterations of the plans should consider including such information. At least eight states and two counties in Alabama have established programs that seek to identify and/or prioritize wetland acreage in their states for its restoration potential. These states include Arkansas, Florida, Georgia, Maryland, Minnesota, North Carolina, Ohio, and Washington State. State restoration prioritization programs, such as those discussed in Appendix F, could be used to guide the inclusion of wetlands with high wildlife habitat potential in the state wildlife action plans.

Appendices

Appendix A
Federal Wetland Compensatory Mitigation Policy and Other References

Federal Regulations, Guidance, and Plans

1980 §404(b)(1) Guidelines

- Regulations issued by EPA that constitute the substantive environmental criteria used by the Corps in evaluating activities regulated under §404 of the Clean Water Act.
- U.S. Environmental Protection Agency. 1980. *Guidelines for Specification of Disposal Sites for Dredged or Fill Material.* Federal Register. Vol. 45, No. 249: 85336-85357.
- http://www.epa.gov/owow/wetlands/pdf/40cfrPart230.pdf

1990 Memorandum of Agreement

- Agreement between EPA and the Corps outlining the policy and procedures to be used in determining the type and level of mitigation necessary to demonstrate compliance with the §404(b)(1) Guidelines.
- U.S. Environmental Protection Agency and U.S. Department of the Army. February 6, 1990. *Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines.*
- http://www.epa.gov/owow/wetlands/regs/mitigate.html

1995 Mitigation Banking Guidance

- Interagency guidance issued to clarify the manner in which mitigation banks may be established, used, and operated to satisfy the compensatory mitigation requirements of the §404 program.
- Department of Defense, Environmental Protection Agency, Department of Agriculture, Department of the Interior, and Department of Commerce. 1995. *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks.* Federal Register. Vol. 60, No. 228. 58605-58614. Tuesday, November 28, 1995.
- http://www.epa.gov/owow/wetlands/guidance/mitbankn.html

1998 Corps Guidance on the Use of Mitigation Banks in Civil Works Projects

- Implementation guidance issued by the Corps on the use of mitigation banks in Corps Civil Works projects.
- U.S. Army Corps of Engineers. April 22, 1998. *Use of Mitigation Banks for U.S. Army Corps of Engineers Civil Works Projects*. Policy Guidance Letter (PGL) No. 46.
- http://www.usace.army.mil/cw/cecw-p/pgls/pgl46b.pdf

1999 Fish and Wildlife Service Policy on Wildlife Refuges and Compensatory Mitigation

- Guidelines issued by the Fish and Wildlife Service regarding siting compensatory mitigation projects conducted under §404 on lands in the National Wildlife Refuge System.
- U.S. Fish and Wildlife Service. September 10, 1999. *Final Policy on the National Wildlife Refuge System and Compensatory Mitigation Under the Section 10/404 Program.* Federal Register. Vol. 64, No. 175: 49229-49234.
- http://www.fws.gov/habitatconservation/Refuge%20Mitigation%20Policy%201999FR.pdf

2000 In-Lieu-Fee Guidance

- Interagency guidance issued to clarify the agencies' policy on the manner in which in-lieu-fee mitigation may be used to satisfy compensatory mitigation requirements.
- U.S. Department of the Army, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration. October 31, 2000. *Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.*
- http://www.epa.gov/owow/wetlands/pdf/inlieufee.pdf

2002 Mitigation Regulatory Guidance Letter 02-2

- Guidance issued by the Corps and EPA clarifying the Corps' policies and procedures regarding all compensatory mitigation proposals associated with permit applications.
- U.S. Army Corps of Engineers and US Environmental Protection Agency. December 24, 2002. *Guidance on Compensatory Mitigation*

Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Regulatory Guidance Letter No. 02-2.
- http://www.usace.army.mil/cw/cecwo/reg/rgls/RGL2-02.pdf

2002 National Mitigation Action Plan

- An interagency plan endorsing the goal of no net loss of wetlands and outlining specific action items that address the concerns of the NAS, GAO, and other independent evaluations.
- Department of the Army, Environmental Protection Agency, Department of Commerce, Department of Interior, Department of Agriculture, Department of Transportation. December 24, 2002. *National Mitigation Action Plan.*
- http://www.mitigationactionplan.gov/map.html

2003 Guidance for the Establishment, Use and Operation of Conservation Banks

- Guidance issued by FWS to help Service personnel evaluate proposals to establish conservation banks. The document provides guidance on the establishment, use, and operation of conservation banks for the purpose of providing a tool for mitigating adverse impacts to species listed as threatened or endangered under the Endangered Species Act of 1973, as amended. The guidance can also be used to aid in the establishment of banks for candidate species.
- U.S. Fish and Wildlife Service. May 2, 2003. *Guidance for the Establishment, Use, and Operation of Conservation Banks.*
- http://www.fws.gov/endangered/pdfs/conservation-banking.pdf

2003 Guidance on the Use of the TEA-21 Preference for Mitigation Banking

- Guidance issued by EPA, Department of the Army, and Federal Highway Administration on applying the preference for wetlands mitigation banking mandated in the Transportation Equity Act for the 21st Century (TEA-21) to compensatory mitigation requirements under §404.
- Department of the Army, Federal Highway Administration, and U.S. Environmental Protection Agency. July 11, 2003. *Federal Guidance on the Use of the TEA-21 Preference for Mitigation Banking to Fulfill Mitigation Requirements Under Section 404 of the Clean Water Act.*
- http://www.epa.gov/owow/wetlands/pdf/TEA-21Guidance.pdf

2003 Interagency Memorandum of Agreement on Protecting Aviation from Wildlife Hazards

- A Memorandum of Agreement signed by the Federal Aviation Administration, U.S. Air Force, Department of the Army, EPA, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture establishing procedures to coordinate efforts to minimize wildlife risks to aviation and human safety, while protecting natural resources.
- Federal Aviation Administration, U.S. Air Force, Department of the Army, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture. July 2003. *Memorandum of Agreement Between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes.*
- http://www.mitigationactionplan.gov/moa.pdf

2003 Operational Guidelines for Creating or Restoring Self-Sustaining Wetlands

- Memorandum to the field issued by the Corps that identifies basic requirements for planning and siting successful mitigation projects.
- U.S. Army Corps of Engineers. October 29, 2003. *Model "Operational Guidelines for Creating or Restoring Wetlands that are Ecologically Self-Sustaining" for Aquatic Resource Impacts Under the corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.* Memorandum to the Field.
- http://www.mitigationactionplan.gov/nas404program.pdf

2003 Model Compensatory Mitigation Plan Checklist

- Memorandum to the field issued by EPA and the Corps that includes a model compensatory mitigation plan checklist and supplemental materials to

guide permit applicants preparing compensatory mitigation plans.
- U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. November 7, 2003. *Model Compensatory Mitigation Plan Checklist for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.* Memorandum to the Field.
- http://www.mitigationactionplan.gov/checklist.pdf

2004 Federal Aviation Administration Advisory Circular

- Guidance issued by the Federal Aviation Administration on locating land uses, including wetland compensatory mitigation sites, which have the potential to attract hazardous wildlife to or in the vicinity of public-use airports.
- U.S. Department of Transportation, Federal Aviation Administration. July 7, 2004. *Advisory Circular: Hazardous Wildlife Attractants On or Near Airports.* AC No: 150/5200-33A.
- http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5200-33A/150_5200_33a.pdf

2006 Minimum Monitoring Requirements Regulatory Guidance Letter 06-03

- Guidance issued by the Corps to the Districts and the regulatory community on minimum monitory requirements for compensatory mitigation projects, as well as the required content of monitoring reports.
- U.S. Army Corps of Engineers. August 3, 2006. *Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Creation, Restoration, and/or Enhancement of Aquatic Resources.* Regulatory Guidance Letter No. 06-03.
- http://www.usace.army.mil/cw/cecwo/reg/rgls/rgl06_03.pdf

Proposed Regulations and Guidance

2007 Draft Recovery Crediting Guidance

- Draft guidance published by FWS on a recovery crediting system that is designed to give federal agencies flexibility to offset the impact of their actions on threatened and endangered species found on federal lands by undertaking conservation actions on non-federal lands.
- U.S. Fish and Wildlife Service. November 2, 2007. "Endangered and Threatened Wildlife and Plants; Notice of Availability for Draft Recovery Crediting Guidance." Federal Register. Vol. 72, No. 212: 62258-62264.
- http://www.fws.gov/endangered/policy/recovery%20crediting.pdf

2006 Proposed Compensatory Mitigation Regulations

- Proposed revisions to regulations governing compensatory mitigation for authorized impacts to wetlands, streams, and other waters of the U.S. under §404 issued by EPA and the Corps on March 27, 2006.
- Department of Defense and Environmental Protection Agency. March 28, 2006. *Compensatory Mitigation for Losses of Aquatic Resources; Proposed Rule.* Federal Register. Vol. 71, No. 59: 15520-15556.
- http://www.epa.gov/owow/wetlands/pdf/MitRuleNPRM.pdf

Other References

2005 Corps Compensatory Mitigation Practices Working Paper

- Issued by the Corps' Institute for Water Resources in March 2006, summarizes the current practice and status of compensatory mitigation authorized by the Corps' regulatory program.
- Martin, Steven, Robert Brumbaugh, Paul Scodari, and David Olsen. March 2006. *Compensatory Mitigation Practices in the U.S. Army Corps of Engineers.* U.S. Army Corps of Engineers Working Paper.
- http://www2.eli.org/pdf/mitigation_forum_2006/Mitigation_Status_2005.pdf

2005 Status Report on Compensatory Mitigation in the United States

- Issued by the Environmental Law Institute in April 2006, summarizes the findings of a survey of all 38 Corps districts; characterizes compensatory mitigation and provides an updated list of approved wet-

land mitigation banks, umbrella banking programs, and in-lieu fee mitigation programs.
- Wilkinson, Jessica and Jared Thompson. April 2006. *2005 Status Report on Compensatory Mitigation in the United States*. Washington, DC: Environmental Law Institute.
- http://www.elistore.org/reports_detail.asp?ID=11137

2005 Study on In-Lieu Fee Mitigation

- Issued by the Environmental Law Institute, a report providing a comprehensive profile of the nation's active wetland and stream in-lieu fee mitigation programs.
- Wilkinson, Jessica, Roxanne Thomas and Jared Thompson. June 2006. *The Status and Character of In-Lieu Fee Mitigation in the United States.* Washington, DC: Environmental Law Institute.
- http://www.elistore.org/reports_detail.asp?ID=11151

2005 GAO report: Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring

- A Government Accountability Office report released in September 2005, summarizing the Corps' oversight of compensatory mitigation projects.
- Government Accountability Office. September 2005. *Wetlands Protection: Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring.* Washington, DC: GAO. GAO-05-898.
- http://www.epa.gov/owow/wetlands/pdf/GAO05898.pdf

2001 NRC Report: Compensating for Wetland Losses under the Clean Water Act

- Published in 2001 by National Academies of Sciences' National Research Council, investigates the adequacy of currently available science and technology for replacing wetland functions and evaluates the effectiveness of the federal compensatory mitigation program in accomplishing the 'no net loss' goal for wetlands.
- National Research Council. 2001. *Compensating for Wetland Losses Under the Clean Water Act.* National Academy Press.
- http://www.nap.edu/books/0309074320/html

1995 IWR Technical Paper: Technical and Procedural Support to Mitigation Banking Guidance

- Published as part of the Institute for Water Resource's National Wetland Mitigation Banking Study, the report elaborates on specific sections of the Federal Mitigation Banking Guidance, including bank planning, success criteria and monitoring, determination of credits and debits, accounting procedures and formats, and financial and legal assurances.
- U.S. Army Corps of Engineers, Institute for Water Resources. December 1995. "National Wetland Mitigation Banking Study: Technical and Procedural Support to Mitigation Banking Guidance." IWR Technical Paper WMB-TP-2. See Chapter Five: "Financial and Legal Assurances."
- http://www.iwr.usace.army.mil/inside/products/pub/iwrreports/WMB-TP-2.pdf

Appendix B
Bibliography of Corps District Wetland Mitigation Banking Policy

I. District Guidelines for Compensatory Mitigation

(NOTE: As noted below, these documents may also include specific guidelines on mitigation banking, in-lieu-fee mitigation, or mitigation checklists)

Albuquerque District, U.S. Army Corps of Engineers. "Albuquerque District Mitigation and Monitoring Guidelines." June 28, 2004. (Includes mitigation plan checklist.) http://www.spa.usace.army.mil/reg/200300788-1/Final%20Guidelines%20combined.pdf.

Baltimore District, U.S. Army Corps of Engineers. "Mitigation and Monitoring Guidelines." November 2004. (Includes Mitigation Plan Checklist.) http://www.nab.usace.army.mil/Regulatory/Mitigation/FinalMitigationGuidelinesNov04.pdf.

"Maryland Compensatory Mitigation Guidance." August 1994. http://www.nab.usace.army.mil/Regulatory/Mitigation/MDCompensatoryMitigationGuidance.pdf.

Buffalo District, U.S. Army Corps of Engineers. "Mitigation and Monitoring Guidance." October 2004. (Includes Mitigation Plan Checklist.) http://www.lrb.usace.army.mil/regulatory/mitigation.htm.

Charleston District, U.S. Army Corps of Engineers. "Compensatory Mitigation Standard Operating Procedure." September 19, 2002. (Includes Restrictive Covenants Model and information on credit determination.) http://www.sac.usace.army.mil/permits/sop02-01.pdf.

Chicago District, U.S. Army Corps of Engineers. "Chicago District 2004 Mitigation Requirements." 2004. (Includes guidance on monitoring and performance standards.) http://www.lrc.usace.army.mil/co%2Dr/mitgr.htm.

Detroit District, U.S. Army Corps of Engineers. "Detroit District U.S. Army Corps of Engineers Mitigation Guidelines and Requirements." November 2006. (Includes guidance on monitoring and performance standards, and a mitigation plan checklist.) http://www.lre.usace.army.mil/functions/rf/html/Mitguidefinal_1106.pdf.

Fort Worth District, U.S. Army Corps of Engineers. "Draft Mitigation Guidelines." December 24, 2003. (Includes guidance on monitoring and performance standards, and a mitigation plan checklist.) http://www.swf.usace.army.mil/pubdata/environ/regulatory/permitting/mitigation/fwmitguid.pdf.

Honolulu District, U.S. Army Corps of Engineers. "Honolulu District Compensatory Mitigation and Monitoring Guidelines." February 14, 2005. http://www.poh.usace.army.mil/pa/publicNotices/SPN20050214%2004-448.pdf.

Little Rock District, U.S. Army Corps of Engineers. "Compensatory Mitigation: Standard Operating Procedures." June 9, 2006. (Includes mitigation plan checklist.) http://www.swl.usace.army.mil/regulatory/pdf/compensatorymitigationguidelines.pdf.

"Components of a Compensatory Mitigation Plan." Undated. http://www.swl.usace.army.mil/regulatory/component.html.

Los Angeles District, U.S. Army Corps of Engineers. "Final Mitigation Guidelines and Monitoring Requirements." April 29, 2004. http://www.spl.usace.army.mil/regulatory/mmg_2004.pdf. (Includes Mitigation Plan Checklist.)

Louisville District, U.S. Army Corps of Engineers. "Mitigation Guidelines." September 22, 2004. (Includes Mitigation Plan Checklist and guidance on monitoring.) http://www.lrl.usace.army.mil/orf/article.asp?id=273.

"Wetland Mitigation Guidelines." Undated. http://www.lrl.usace.army.mil/orf/article.asp?id=153.

Memphis District, U.S. Army Corps of Engineers. "Mitigation Guidance and Monitoring Guidelines." September 24, 2004. (Includes Mitigation Plan Checklist.) http://www.mvm.usace.army.mil/regulatory/guidelines/Mitigation.Guidelines.pdf.

Mobile District, U.S. Army Corps of Engineers. "Compensatory Mitigation Guidelines." September 22, 2006. (Includes Mitigation Plan Checklist.) http://www.sam.usace.army.mil/RD/reg/SAM-2006-2008-MBM.pdf.

Nashville District, U.S. Army Corps of Engineers. "Mitigation Guidelines for the Nashville District Regulatory Program." August 2004. (Includes Mitigation Plan Checklist.) http://www.lrn.usace.army.mil/cof/pdf/finalmitigationaug.pdf.

New England District, U.S. Army Corps of Engineers. "New England District Mitigation Guidance." January 12, 2007. (Includes guidance on monitoring.) http://www.nae.usace.army.mil/reg/Mitigation%20Plan%20Checklist%20Guidance.pdf.

New Orleans District, U.S. Army Corps of Engineers. "Compensatory Mitigation Standard Operating Procedures." June 29, 2004. (Includes Mitigation Plan Checklist.) http://www.mvn.usace.army.mil/ops/regulatory/mitigateSOP.pdf.

"Mitigation Guidelines." Undated. http://www.mvn.usace.army.mil/ops/regulatory/guide.htm.

New York District, U.S. Army Corps of Engineers. "Final Notice Announcing the Compensatory Mitigation Guidelines and Mitigation Checklist for Review of Mitigation Plans for the U.S. Army Corps of Engineers, New York District." January 10, 2005. (Includes Mitigation Plan Checklist and guidance on monitoring.) http://www.nan.usace.army.mil/business/buslinks/regulat/pnotices/mitfinal.pdf.

Norfolk District, U.S. Army Corps of Engineers. "Norfolk District Corps and Virginia Department of Environmental Quality Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance and Monitoring Criteria." July 12, 2004. http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/Guidance/Annotated_Corps-DEQ_Mit_7-04.pdf.

Omaha District, U.S. Army Corps of Engineers. "The U.S. Army Corps of Engineers' Guidance for Compensatory Mitigation and Mitigation Banking in the Omaha District." August 2005. (Includes guidance on monitoring.) https://www.nwo.usace.army.mil/html/od-r/mitbnk.htm.

Philadelphia District, U.S. Army Corps of Engineers. "Draft Compensatory Mitigation Guidelines." December 13, 2003. (Includes guidance on monitoring.) http://www.nap.usace.army.mil/cenap-op/regulatory/draft_mit_guidelines.pdf.

Portland District, U.S. Army Corps of Engineers. "Mitigation Guidelines and Monitoring Requirements." Undated. http://www.nwp.usace.army.mil/op/g/docs/documents/Mitigation%20Guidelines%20and%20Monitoring%20Requirements.pdf.

Rock Island District, U.S. Army Corps of Engineers. "Rock Island District Mitigation and Monitoring Guidelines." June 29, 2004. (Includes Mitigation Plan Checklist.) http://www2.mvr.usace.army.mil/Regulatory/Documents/mitigation_guidance6-29-04.pdf.

Sacramento and San Francisco Districts, U.S. Army Corps of Engineers. "Mitigation and Monitoring Proposal Guidelines." December 30, 2004. (Includes Mitigation Plan Outline.) http://www.spk.usace.army.mil/organizations/cespk-co/regulatory/pdf/Mitigation_Monitoring_Guidelines.pdf.

Savannah District, U.S. Army Corps of Engineers. "Standard Operating Procedure: Compensatory Mitigation." March 2004. (Includes Mitigation Plan Checklist and guidance on monitoring.) http://www.sas.usace.army.mil/SOP.04.doc.

Seattle District, U.S. Army Corps of Engineers, Washington Department of Ecology, U.S. Environmental Protection Agency, Region 10. "Wetland Mitigation in Washington State: Part I – Agency Policies and Guidance." March 2006. http://www.ecy.wa.gov/programs/sea/wetlands/mitigation/guidance/index.html

"Wetland Mitigation in Washington State: Part II – Developing Mitigation Plans." March 2006. (Includes Mitigation Plan Checklist and guidance on monitoring.) http://www.ecy.wa.gov/programs/sea/wetlands/mitigation/guidance/index.html.

St. Louis District, U.S. Army Corps of Engineers. "St. Louis District Mitigation and Monitoring Guidelines." June 30, 2004. (Includes Mitigation Plan Checklist.) http://www.mvs.usace.army.mil/permits/Guidelines.pdf.

St. Paul District, U.S. Army Corps of Engineers, Wisconsin Department of Natural Resources. "Guidelines for Wetland Compensatory Mitigation in Wisconsin." February 2002. (Includes outline of mitigation plan, guidance on establishing credit, guidance on mitigation banking, and example easement.) http://dnr.wi.gov/org/water/fhp/wetlands/mitigation/index.shtml.

Tulsa District, U.S. Army Corps of Engineers. "Aquatic Resource Mitigation and Monitoring Guidelines." October 12, 2004. http://www.swt.usace.army.mil/permits/Mitigation.cfm#7.

Vicksburg District, U.S. Army Corps of Engineers. "Standard Operating Procedures for the States of Mississippi, Arkansas, and Louisiana." August 30, 2004. (Includes Mitigation Plan Checklist.) http://www.mvk.usace.army.mil/offices/od/odf/PubNotice/JCB-200400320%20Special%20Public%20Notice.pdf.

Walla Walla District, U.S. Army Corps of Engineers. "Mitigation and Monitoring Guidelines." December 15, 2003. (Includes Deed of Conservation Easement.) http://www.nww.usace.army.mil/html/offices/op/rf/mitigation_guidelines.htm.

Wilmington District, U.S. Army Corps of Engineers. "Mitigation for Wetlands and Streams." December 2003. http://www.saw.usace.army.mil/wetlands/Mitigation/index.html.

II. Mitigation Banking Guidance

Charleston District, U.S. Army Corps of Engineers, *et al.* "Joint State/Federal Administrative Procedures for the Establishment and Operation of Mitigation Banks in South Carolina." September 2002. http://www.sac.usace.army.mil/assets/pdf/regulatory/mitigation/establishment_operation_mitigation_banks_SC-Sept-2002.pdf.

Chicago District, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service. "Interagency Coordination Agreement on Wetland Mitigation Banking within the Regulatory Boundaries of Chicago District, Corps of Engineers." January 1997. http://www.lrc.usace.army.mil/co-r/ica_all.htm.

Fort Worth District, U.S. Army Corps of Engineers. "Mitigation Banking in the Fort Worth District." July 28, 2004. http://www.swf.usace.army.mil/pub-data/environ/regulatory/permitting/mitigation/MitigationBankingintheFortWorthDistrict.pdf.

Galveston District, U.S. Army Corps of Engineers. "Draft Guidelines for and Procedures for the Development and Use of Mitigation Banks." Undated. http://www.swg.usace.army.mil/reg/mitigation/bank/draft%20guidelines%20document%20and%20links/dmit.htm.

Jacksonville District, U.S. Army Corps of Engineers, *et al.* "Joint State/Federal Mitigation Bank Review Team Process for Florida." October 1998. http://www.saj.usace.army.mil/regulatory/permitting/mitigation/mBanks.htm.

"Draft Estuarine Wetland Rapid Assessment Procedures for Mitigation Banks in Florida." Undated. http://www.saj.usace.army.mil/permit/mitigation/E-WRAP.pdf.

Louisville and Detroit Districts, U.S. Army Corps of Engineers, Natural Resources Conservation Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Indiana Department of Environmental Management and the Indiana Department of Natural Resources (Indiana Mitigation Banking Review Team). "Interagency Coordination Agreement on Wetland Mitigation Banking Within the State of Indiana." April 24, 2002. http://www.lre.usace.army.mil/functions/rf/html/inbank.pdf

Mobile District, U.S. Army Corps of Engineers. "Joint Federal/State Procedures for the Establishment and Operation of Wetland Mitigation Banks in the U.S. Army Corps of Engineers Mobile District (draft)." April 2002. https://samribits.sam.usace.army.mil/ribits/bank_estab.php

New Orleans District, U.S. Army Corps of Engineers. "Mitigation Banks & Areas." Undated. http://www.mvn.usace.army.mil/ops/regulatory/bank.htm.

Norfolk District, U.S. Army Corps of Engineers. "Joint Federal/State Procedures for the Establishment and Operation of Wetland Mitigation Banks in the U.S. Army Corps of Engineers Norfolk District." Undated. https://155.78.20.213/ribits/bank_estab.php.

"Mitigation Banks Do's and Don'ts." January 25, 2005. http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/Mitigation%20Banks/mitigationbanksdosdonts.pdf.

Omaha District, U.S. Army Corps of Engineers. "The U.S. Army Corps of Engineers' Guidance for Compensatory Mitigation and Mitigation Banking in the Omaha District." August 2005. https://www.nwo.usace.army.mil/html/od-r/mitbnk.htm.

Portland District, U.S. Army Corps of Engineers. "Public Notice: Mitigation Banking." September 7, 2005. https://www.nwp.usace.army.mil/op/g/docs/documents/Federal%20Funding.pdf.

"Wetland Mitigation Banking Guidebook for Oregon." October 2000. https://www.nwp.usace.army.mil/op/g/docs/documents/Mitigation%20Banking%20Guidebook.pdf.

St. Louis District, U.S. Army Corps of Engineers. "Mitigation Banks." September 1, 2005. http://www.mvs.usace.army.mil/permits/Banks.htm.

St. Paul District, U.S. Army Corps of Engineers, Wisconsin Department of Natural Resources. "Guidelines for Wetland Compensatory Mitigation in Wisconsin." February 2002. (Includes outline of mitigation plan, guidance on establishing credit, guidance on mitigation banking, and example easement.) http://dnr.wi.gov/org/water/fhp/wetlands/mitigation/index.shtml.

San Francisco District, U.S. Army Corps of Engineers. "Enhancement Crediting Alternatives for Wetland Mitigation Banks in the Santa Rosa Plain." http://www.spn.usace.army.mil/regulatory/mitigation/March05.pdf.

"Information Coversheet to Bank Applicants for Wetland and Other Banking Proposals." September 5, 2006. http://www.spn.usace.army.mil/regulatory/mitigation/MBRT.pdf.

"Wetland Mitigation Bank Credit Release Schedule." May 17, 2005. http://www.spn.usace.army.mil/regulatory/mitigation/May05.pdf.

Savannah District, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Region IV, U.S. Fish & Wildlife Service, Southeast Region, and Georgia Department of Natural Resources. "Addendum 1 to the Guidelines." January 16, 1996. http://www.sas.usace.army.mil/ADDEND1.doc.

"Guidelines on the Establishment and Operation of Wetland Mitigation Banks in Georgia." Undated. http://www.sas.usace.army.mil/bankguid2.htm.

"Mitigation Bank Service Areas." Undated. http://www.sas.usace.army.mil/MBSA.htm.

South Carolina Mitigation Bank Review Team. "South Carolina Mitigation Banking Process." January 25, 1999. http://www.sac.usace.army.mil/permits/m_steps.pdf.

Wilmington District, U.S. Army Corps of Engineers. "Mitigation Banks." March 16, 2005. http://www.saw.usace.army.mil/wetlands/Mitigation/mitbanks.html.

Appendix C
State Wetland Mitigation Banking Statutes, Regulations, and Guidance Documents[1]

State	Statute(s)	Regulation(s)	Guidance Document(s)
Alabama	*	*	*
Alaska	*	*	*
Arizona	*	*	*
Arkansas	Ark. Code Ann. §§15-22-1001 – 1012.	Ark. Reg. §§1201.1 – 1206.3.	Arkansas Department of Environmental Quality, Arkansas Soil and Water Conservation Commission, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, USDA Natural Resources Conservation Service. "Umbrella Memorandum of Agreement for the Establishment, Development, and Operation of an Arkansas State-Sponsored Wetlands Mitigation Bank Program." 1998.
California	Cal. Fish & Game Code §§1175-1796, 1850 – 1851.	Cal. Code Reg. tit. 23, § 3856(h)(5).	California Resources Agency and California Environmental Protection Agency. "Official Policy on Conservation Banks." April 7, 1995.[2]
Colorado	*	*	*
Connecticut	*	*	*
Delaware	*	7-7201 Del. Code Rags. § 1 et seq.[3]	*
Florida	Fla. Stat. ch. 373.4135-.4137, ch. 373.414, ch. 403.9322.	Fla. Admin. Code Ann. R. 62-342.100 – 62-342.850.	"Joint State/Federal Mitigation Bank Review Team Process for Florida." October 1998.[4]
Georgia	*	*	Savannah District, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Region IV, U.S. Fish & Wildlife Service, Southeast Region, and Georgia Department of Natural Resources. "Guidelines on the Establishment and Operation of Wetland Mitigation Banks in Georgia." Undated;[5] "Addendum 1 to the Guidelines." January 16, 1996.[6]
Hawaii	*	*	*
Idaho	*	*	*
Illinois	*	*	*

[1] General data sources for this chart include: Environmental Law Institute. September 2002. *Banks and Fees: The Status of Off-Site Wetland Mitigation in the United States*. Washington, D.C.: Environmental Law Institute. Appendix E, pp. 165-169. Available at: http://www.elistore.org/reports_detail.asp?ID=10695.; Environmental Law Institute. January 2005. *State Wetland Program Evaluation: Phase I*. Washington, D.C.: Environmental Law Institute. Available at: http://www.elistore.org/reports_detail.asp?ID=11079.; Environmental Law Institute. June 2006. *State Wetland Program Evaluation: Phase II*. Washington, D.C.: Environmental Law Institute. Available at: http://www.elistore.org/reports_detail.asp?ID=11152.; Environmental Law Institute. March 2007. *State Wetland Program Evaluation: Phase III*. Washington, D.C.: Environmental Law Institute. Available at: http://www.elistore.org/reports_detail.asp?ID=11215.

[2] See: http://ceres.ca.gov/wetlands/policies/mitbank.html.

[3] See: http://www.dnrec.state.de.us/water2000/Sections/SurfWater/Library/RGCWP.pdf.

[4] See: http://www.saj.usace.army.mil/regulatory/permitting/mitigation/mBanks.htm.

[5] See: http://www.sas.usace.army.mil/bankguid2.htm.

[6] See: http://www.sas.usace.army.mil/ADDEND1.doc.

State	Statute(s)	Regulation(s)	Guidance Document(s)
Indiana	*	*	Louisville and Detroit Districts, U.S. Army Corps of Engineers, *et al.* (Indiana Mitigation Banking Review Team). "Interagency Coordination Agreement on Wetland Mitigation Banking Within the State of Indiana." April 24, 2002;[7] Natural Resources Commission. Revised November 14, 2006. "Wetlands and Habitat Mitigation." Information Bulletin #17. Indiana Register. 20 IR 3546.[8]
Iowa	*	*	Iowa MBRT. "Mitigation Banking in Iowa." Draft.[9]
Kansas	*	*	*
Kentucky	Ky. Rev. Stat. Ann. §150.255.	*	*
Louisiana	La. Rev. Stat. Ann. §49:214.41.	La. Admin. Code tit. 43:I §724(F).	*
Maine	Me. Rev. Stat. Ann. Tit. 38, §480-Z.	310 Code Me. R. §§5, 7.	Maine Land Use Regulation Commission. "Wetland Compensation Guidelines." 1998.[10]
Maryland	Md. Regs. Code tit. 26, §§23.04.01 - .07, 26.24.05.01.	Md. Code §5-910.	*
Massachusetts	*	*	*
Michigan	*	12 Mich. Admin. Code R. §§281.951-.961.[11]	"MDEQ Wetland Mitigation Banking Handbook." September 2001.[12]
Minnesota	Minn. Stat. Ann. §103G.2242.	Minn. R. §§8420.0200(1), .0510, .0630, .0700 - .0760.	Minnesota Board of Water & Soil Resources. "Wetland Banking Fee Policy." December 2003[13]; Minnesota Board of Water & Soil Resources. "Wetland Banking Fee Policy." September 2007.[14]
Mississippi	*	*	*
Missouri	*	*	*
Montana	*	*	*
Nebraska	Neb. Rev. Stat. §39-1320.	*	*
Nevada	Nev. Rev. Stat. §244.388.	*	*
New Hampshire	*	*	*
New Jersey	N.J. Stat. Ann. §§13:9B-3 – 13:9B-5, 13:9B-13 – 13:9B-15.	N.J. Admin Code tit. 7, §§7A-14.1 – 14.6.	*

[7] See: http://www.lre.usace.army.mil/functions/rf/html/inbank.pdf.

[8] See: http://www.in.gov/legislative/register/20061213-IR-312060562NRA.xml.pdf.

[9] Referenced in: Smith, Duane and Steve Andrle, Dennis Kroeger. November 2006. "Smart Wetlands Mitigation for Iowa Department of Transportation Projects." Iowa Department of Transportation. http://www.ctre.iastate.edu/reports/wetlands_mitigation.pdf.

[10] See: http://www.maine.gov/tools/whatsnew/attach.php?id=2811&an=1.

[11] See: http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=28100951&Dpt=EQ&RngHigh=.

[12] See: http://www.deq.state.mi.us/documents/deq-water-wetlands-webhandbook.pdf.

[13] See: http://www.bwsr.state.mn.us/wetlands/wetlandbanking/fees.html.

[14] See: http://www.bwsr.state.mn.us/wetlands/wetlandbanking/fees-2008.html.

State	Statute(s)	Regulation(s)	Guidance Document(s)
New Mexico	*	*	*
New York	*	*	Memorandum from Patricia Riexinger, New York Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, to Natural Resource Supervisors, New York Department of Environmental Conservation (Dec. 24, 2002).
North Carolina	N.C. Gen. Stat. §§143.214.8 - .11.	N.C. Admin. Code tit. 15A 02R.0302, 0402.	*
North Dakota	*	*	*
Ohio	Ohio Rev. Code Ann. § 6111.027.	Ohio Admin. Code §3745-1-54.	*
Oklahoma	*	*	Oklahoma Department of Transportation, Oklahoma's Office of the Secretary of the Environment, Oklahoma Conservation Commission, Oklahoma Department of Wildlife Conservation, Oklahoma Department of Environmental Quality, The Nature Conservancy, Tulsa District of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, Natural Resources Conservation Service, and Federal Highway Administration. "Memorandum of Agreement." 1996.
Oregon	Or. Rev. Stat. §§196.600 - .665.	Or. Admin. R. 141-085-0115, 141-085-0260 – 0650.	Portland District, U.S. Army Corps of Engineers. "Wetland Mitigation Banking Guidebook for Oregon." October 2000.[15]
Pennsylvania	*	*	*
Rhode Island	*	*	*
South Carolina	*	*	Charleston District, U.S. Army Corps of Engineers, *et al.* "Joint State/Federal Administrative Procedures for the Establishment and Operation of Mitigation Banks in South Carolina." September 2002.[16]
South Dakota	*	*	*
Tennessee	Tenn. Code Ann. §70-1-302(e).	*	Memphis and Nashville Corps Districts, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, Federal Highway Administration, and Tennessee Department of Transportation. "General Wetland Banking Memorandum of Agreement." June 12, 1995.
Texas	12 Tex. Nat. Res. Code Ann. §§221.001-.048.	*	*
Utah	*	*	*
Vermont	*	*	*
Virginia	Va. Code Ann. §§28.2-1308, 33.1-223.2:1, 62.1-44.23.	4 Va. Admin. Code § 20-390-10 et. seq.	Virginia Marine Resources Commission and Virginia Institute of Marine Science. "Guidelines for Establishment, Use and Operation of Tidal Wetland Mitigation Banks In Virginia." 1998.[17]

[15] See: https://www.nwp.usace.army.mil/op/g/docs/documents/Mitigation%20Banking%20Guidebook.pdf.

[16] See: http://www.sac.usace.army.mil/assets/pdf/regulatory/mitigation/establishment_operation_mitigation_banks_SC-Sept-2002.pdf.

[17] See: http://www.mrc.state.va.us/regulations/bankguide.shtm.

State	Statute(s)	Regulation(s)	Guidance Document(s)
Washington	Wash. Rev. Code Ann. §§90.84.005 - .070, 47.12.330 - .360.	*	Washington Department of Ecology, Seattle District, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Region 10. "Wetland Mitigation in Washington State: Part I – Agency Policies and Guidance." March 2006;[18] U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Federal Highway Administration, Washington State Department of Ecology, Washington State Department of Fish and Wildlife, Washington State Department of Transportation. "Washington State Department of Transportation Wetland Compensation Bank Program Memorandum of Agreement." February 15, 1994.[19]
West Virginia	*	*	*
Wisconsin	Wis. Stat. § 281.37.	Wis. Admin. Code §§ 350.01 – 350.14.	St. Paul District, U.S. Army Corps of Engineers, Wisconsin Department of Natural Resources. "Guidelines for Wetland Compensatory Mitigation in Wisconsin." February 2002[20]; Wisconsin Department of Transportation. "Wetland Mitigation Banking Technical Guidelines." July 1993.
Wyoming	Wyo. Stat. Ann. §§35-11-308 – 311.	Ch. 1 of Wyoming Water Quality Rules and Regulations § 12.	Wyoming Department of Environmental Quality. "Wyoming Statewide Wetland Mitigation Bank: Guidelines for Interpretation and Implementation." April 1995.[21]

* If an entry is missing for a state, the state does not have wetland mitigation statutes, regulations and/or guidance.

[18] See: http://www.ecy.wa.gov/biblio/0606011a.html.

[19] See: http://www.wsdot.wa.gov/NR/rdonlyres/D2CB4169-FC69-4422-BC99-B65E7FD4F6A6/0/WetlandMOAFinal1994.pdf.

[20] See: http://dnr.wi.gov/org/es/science/publications/wetland_mitig.pdf.

[21] See: http://deq.state.wy.us/wqd/watershed/Downloads/Wetlands/wet_guidelines.pdf.

Appendix D
State Conservation Banking Statutes, Regulations, and Guidance Documents

State	Statute(s)	Regulation(s)	Guidance Document(s)
California	Cal. Fish & Game Code §§1175-1796, 1850 – 1851.	Cal. Code Reg. tit. 23, § 3856(h)(5).	California Resources Agency and California Environmental Protection Agency. "Official Policy on Conservation Banks." April 7, 1995.[1]

[1] See: http://ceres.ca.gov/wetlands/policies/mitbank.html.

Appendix E
State Wetland Mitigation Banking Programs – Narrative Descriptions

The research for this section was conducted as part of a grant from the U.S. Environmental Protection Agency. The research was carried out in phases over a four year period. ELI analyzed seven "core" components of state wetland programs: state laws, regulations, and programs; monitoring and assessment; restoration programs and activities; water quality standards; public-private partnerships; coordination among state and federal agencies; and education and outreach activities. Each state summary was reviewed by at least one state wetland program manger in the relevant state. The phase during which the states' programs were reviewed is identified in a parenthetical reference following the state name. The four phases correspond to the following time periods during which the research was carried out: Phase I - 11/03-11/04; Phase II - 03/05-03/06; Phase III - 10/05-12/06; and Phase IV - 11/06-8/07.

Alabama (Phase III)

With the exception of a few basic regulatory requirements for mitigation of coastal area wetland impacts under the state's coastal program, Alabama has not adopted legislation, regulations, or guidelines on compensatory mitigation for wetlands and generally defers to the Corps for wetland-related jurisdictional and mitigation issues. State regulations do require that "[m]itigation for wetland impacts resulting from an approved project shall involve the creation of wetlands or the restoration and enhancement of existing degraded wetlands; [and] [p]rior to permitting or certification of a use for which mitigation is required, the applicant shall submit to the Department for review and approval a mitigation plan…"[1]

Although Alabama has no formal guidelines on mitigation banking, both the Alabama Department of Conservation and Natural Resources (ADCNR) and the Alabama Department of Environmental Management (ADEM) have participated in MBRTs in coordination with Army Corps of Engineers Mobile and Nashville Districts.[2]

[1] Ala. Admin. Code r. 335-8- 2-.03, (1994).

[2] Personal communication with Phillip Hinesley, Alabama Department of Conservation and Natural Resources (Jan. 11, 2006); and personal communication with Leslie Turney, Alabama Department of Environmental Management (Jan. 17, 2006).

Alaska (Phase IV)

Alaska has not adopted legislation, regulations, or policies on wetland mitigation banking.[3] A Mitigation Banking Review Team (MRBT) operates in the state, and the Alaska Department of Environmental Conservation is a member.[4]

Arizona (Phase I)

The state of Arizona has no legislation, regulations, or policies that concern compensatory mitigation for permitted impacts to wetlands or streams, nor does the state participate on a Mitigation Banking Review Team.

Arkansas (Phase I)

The Arkansas Wetland Mitigation Bank Program was established in 1995 under the Arkansas Wetland Mitigation Bank Act.[5] The Act was designed to support wetland protection, improve cooperative efforts in the restoration and management of wetlands, and encourage a predictable, efficient regulatory framework for environmentally acceptable mitigation.[6] Under the program, the state acquires degraded wetlands, restores wetland functions, and then sells credits to §404 permittees required to provide compensatory mitigation for approved wetland projects. The Arkansas Wetlands Mitigation Bank is administered by the Arkansas Soil and Water Conservation Commission (ASWCC). State law also established a Wetlands Technical Advisory Committee to oversee administration of the program.[7]

ASWCC plans to establish a bank in each of the state's four ecoregions. One bank has been established in southeastern Arkansas and the state's other three ecoregions are currently being surveyed for bank sites.[8] The ASWCC follows federal guidance for

[3] Personal Communication with Mel Langdon, Alaska Dep't of Envtl Conservation (Jan. 26, 2007)

[4] Id.

[5] Arkansas Wetland Mitigation Bank Act, Ark. Code Ann. §§ 15-22-1001.

[6] Id.

[7] Ark. Code Ann. § 15-22-1003.

[8] Personal Communication with Ken Brazil and Kenneth Colbert, Arkansas Soil and Water Conservation Commission (Feb. 25, 2004).

mitigation banking and has established an *Umbrella Memorandum of Agreement for the Establishment, Development, and Operation of an Arkansas State-Sponsored Wetlands Mitigation Bank Program.*[9]

Arkansas' mitigation banking program comprises the bulk of the state's compensatory mitigation regulations and activities. The state also participates in the area's MBRT with the U.S. Army Corps of Engineers (Vicksburg, Little Rock, and Memphis Districts), U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Department of Agriculture's Natural Resources Conservation Service, and the Arkansas Department of Environmental Quality, as established in the *Umbrella Memorandum of Agreement.*[10]

California (Phase III)

The California Wetlands Conservation Policy's goal of "no net loss" of wetlands guides the state's mitigation procedures.[11] Compensatory mitigation for both wetlands and streams is required by the State Water Resources Control Board (SWRCB) regulations for §401 water quality certifications. The regulations state that all applications for a §401 water quality certification must include the proposed amount of waters of the state that will be restored, enhanced, or created, or for which mitigation bank credits will be purchased.[12] There are no specific SWRCB regulations or guidelines regarding mitigation procedures;[13] however, California Environmental Quality Act (CEQA) requires mitigation for individual and cumulative impacts.[14]

Each State Water Resources Control Board and Regional Water Quality Control Boards (RWQCB) has the authority to decide on and apply mitigation conditions to water quality certifications.[15] Mitigation requirements are designed to fully replace the wetland functions, values, and acreage of the affected habitats. The SWRCB is in the process of drafting a dredged or fill material policy that will have mitigation guidance for all waters of the state impacted by dredging or filling discharges including wetlands and streams.[16]

The California Coastal Act (CCA) requires that all coastal wetland functions be maintained by minimizing impacts.[17] As such, coastal development permits issued for dredge and fill activities in coastal wetlands must include mitigation,[18] including acquisition of wetlands that are of equal or great biological value at a one to one ratio or opening up an equivalent amount of areas to tidal action. If no adequate restoration sites are available, an in-lieu fee may be dedicated to a public agency that is sufficient to purchase a site of equal or greater biological value.[19] However, in-lieu fees must go towards a project that has already been designed and approved.[20] To provide a framework for reviewing mitigation plans and evaluating mitigation projects, the Coastal Commission also published "Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone" in 1995.[21] This guidance

[9] Umbrella Memorandum of Agreement for the Establishment, Development, and Operation of an Arkansas State-Sponsored Wetlands Mitigation Bank Program (1998) (on file with author).

[10] Umbrella Memorandum of Agreement for the Establishment, Development, and Operation of an Arkansas State-Sponsored Wetlands Mitigation Bank Program (1998) (on file with author).

[11] Personal Communication with John Short, North Coast Regional Water Quality Control Board Region 1, (Nov. 29, 2006).

[12] Cal. Code Reg. § 3856(h)(5).

[13] The State Water Board currently is drafting a Dredge and Fill Policy that is due out for review in February 2007. This Policy incorporates the Corps' §404 regulations and will have parallel processes to the Corps in regards to avoidance, minimization, and mitigation procedures. It also incorporates the proposed federal rule on compensatory mitigation. Although the Policy mirrors the Corps §404 regulations and will not result in any new procedures, it does elaborate and reflect state goals. This Policy will apply to all waters of the state including those outside of federal jurisdiction. (Personal Communication with Glenda Marsh, State Water Resources Control Board, (Dec. 7, 2006)).

[14] San Francisco Water Board, (2006), Fact Sheet for Reviewing Wetland and Riparian Projects by the San Francisco Bay Water Board, available at http://www.waterboards.ca.gov/sanfranciscobay/certs.htm.

[15] Cal. Code Reg. § 3859(a).

[16] Personal Communication with Glenda Marsh, State Water Resources Control Board, (Dec. 7, 2006).

[17] Pub. Res. Code § 30231.

[18] Pub. Res. Code § 30233(a).

[19] Pub. Res.Code § 30607.1.

[20] Personal Communication with Susan Hansch, California Coastal Commission, (Dec. 12, 2006).

[21] California Coastal Commission, Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone (1995), Executive Summary, available at http://www.coastal.ca.gov/web/weteval/weexecsu.html.

applies CEQA's mitigation definition which calls for a sequence of avoidance, minimization, restoration, and compensation.[22]

The California Fish and Game Code requires that the California Department of Fish and Game (CDFG) Lake and Streambed Alteration Agreements include requirements to avoid and minimize impacts to fish and wildlife resources. In cases where mitigation is necessary, the CDFG includes relevant requirements.[23] Additionally, the Fish and Game Commission established a Wetlands Resource Policy that opposes any wetland development or conversion unless mitigation will result in a minimum of no net loss of wetlands.[24]

Mitigation banking is legislatively authorized in a Resource Agency policy regarding conservation and mitigation banks.[25] Additionally, in 1993 Governor Wilson signed Sacramento-San Joaquin Valley Wetlands Mitigation Bank Act that required the CDFG to establish mitigation banks in the Central Valley and set out requirements and procedures for the banks.[26] The CDFG has developed policies and procedures for establishing conservation and mitigation banks, and many mitigation banks in California are approved by the CDFG and the Corps.[27]

The North Coast Regional Water Board and the San Francisco Bay Regional Water Board actively participate on the Mitigation Banking Review Team (MBRT) with the Corps San Francisco District.[28] The Coastal Commission will participate on an MBRT when the project is relevant to their activities.[29]

Colorado (Phase I)

Colorado has not adopted legislation, regulations, or policies on wetland mitigation banking. However, inclusion of a mitigation plan is among the state's selected best management practices for applicants seeking §401 water quality certification.[30]

Connecticut (Phase III)

The 1996 amendment to the Inland Wetlands and Watercourses Act (IWWCA) authorizes inland wetland mitigation and establishes the following prioritization for types of compensatory mitigation: restore, enhance and create productive wetlands or watercourse resources. The state law also provides general standards on mitigation. The state does not participate on a Mitigation Banking Review Team.

Although the state does not have legislation, regulations, or guidance on compensatory mitigation for permitted impacts to tidal wetlands,[31] the Office of Long Island Sound Program (OLISP) has developed a policy for the compensation of unavoidable tidal wetland losses for public agency projects with significant public benefits. This policy requires avoidance of impacts and mitigation to the fullest extent possible. Remaining adverse impacts must be deemed acceptable by state permitting staff.[32]

Connecticut has not adopted legislation, regulations, or policies on wetland mitigation banking.

[22] California Coastal Commission, Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone (1995), Mitigation Defined, available at http://www.coastal.ca.gov/web/weteval/we3.html.

[23] Personal Communication with Catherine Vouchilas, Department of Fish and Game, (Dec. 8, 2006).

[24] California Fish and Game Commission, Policies of the Fish and Game Commission, available at http://www.fgc.ca.gov/html/p4misc.html#WETLANDS.

[25] In 1995, the state adopted an official policy regarding conservation banks, which are used for mitigating impacts to various habitats including wetlands. Douglas P. Wheeler, California Resources Agency and James M. Strock, California Environmental Protection Agency, Official Policy on Conservation Banks (1995), available at http://ceres.ca.gov/topic/banking/banking_policy.html.

[26] Fish and Game Code § 1775.

[27] California Department of Fish and Wildlife, "Conservation and Mitigation Banking," available at http://www.dfg.ca.gov/hcpb/conplan/mitbank/catalogue/catalogue.shtml.

[28] Personal Communication with John Short, North Coastal Water Board, (Nov. 29, 2006); Personal Communication with Shin-Roei Lee, San Francisco Water Board, (Jan. 10, 2007).

[29] Personal Communication with Susan Hansch, California Coastal Commission, (Dec. 12, 2006).

[30] 5 Colo. Code Regs. § 1002-82.

[31] Personal communication with Peter Francis, OLISP, CTDEP (August 11, 2006).

[32] Personal communication with Ron Rozsa, OLISP, CTDEP (November 7, 2006).

Delaware (Phase IV)

Delaware's water pollution control regulations outline guidelines for compensatory mitigation.[33] The regulations allow compensatory mitigation requirements to be met through the purchase of credits from a wetland mitigation bank.[34]

Florida (Phase II)

Florida's compensatory mitigation provisions are designed to support the state's goal of achieving a "no net loss" of wetland and other surface water functions. Mitigation measures may be considered only after modifications have been made to eliminate or reduce adverse impacts.[35] Florida applies a uniform mitigation assessment methodology (UMAM) to calculate required compensatory mitigation.[36]

Florida state law authorizes the establishment of wetland mitigation banks.[37] Public or private mitigation banks must obtain an environmental resource/mitigation bank permit from the Florida Department of Environmental Protection (FLDEP) or the appropriate Water Management Districts (WMD).[38] FLDEP, a WMD, or a local government may also sponsor a regional offsite in-lieu fee mitigation project that is paid for by monies accepted as mitigation.[39]

FLDEP and the WMDs participate on the state's interagency Mitigation Bank Review Team (MBRT), along with U.S. Army Corps of Engineers-Jacksonville District, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and USDA Natural Resources Conservation Service.[40]

In 1995, Florida established a mitigation program specific to the Florida Department of Transportation (FLDOT).[41] FLDOT annually provides an inventory of anticipated wetland impacts to the regional WMDs, which then develop mitigation plans in coordination with other state and federal regulatory agencies.[42]

Georgia (Phase I)

Georgia's state laws and regulations do not address wetland or stream mitigation directly. However, the Georgia Department of Natural Resources (GA DNR) is party to the region's MBRT and has developed *Guidelines on the Establishment and Operation of Wetland Mitigation Banks in Georgia* in conjunction with the U.S. Army Corps of Engineers-Savannah District, U.S. Environmental Protection Agency – Region IV, and U.S. Fish and Wildlife Service – Southeast Region. The guidelines are targeted towards state and federal resource agencies and bank sponsors and seek to provide assistance in developing and establishing mitigation banks while meeting the goals of the Clean Water Act.[43]

[33] Del. Dep't of Natural Res. and Envtl. Control; See Fla. Stat. Ann. § 373.421(1); Fla. Admin. Code Ann. r. 62-340.100(1).

[34] State of Delaware Department of Natural Resources and Environmental Control, Regulations Governing The Control of Water Pollution, available at http://www.dnrec.state.de.us/water2000/Sections/SurfWater/Library/RGCWP.pdf.

[35] See: Suwannee River Water Management District Applicant's Handbook 12.2.1-12.2.2.3, St. John's River Water Management District Applicant's Handbook 12.2.1-12.2.2.3, Southwest Florida Water Management District Basis of Review 3.2.1-3.2.2.3., and South Florida Water Management District Basis of Review 4.2.1-4.2.2.3. See also: Florida Department of Environmental Protection, Florida Wetland Regulatory Program Demonstration Project 9 (undated) (on file at ELI), at 15.

[36] Fl. Admin. Code § 62-345. See also: Florida Department of Environmental Protection, Mitigation and Mitigation Banking, at http://www.dep.state.fl.us/water/wetlands/Mitigation/index.htm (2004).

[37] See: Fl. Stat. Ann. § 373.4135 and 373.4136 ; Fl. Admin. Code § 62-342; Suwannee River Water Management District Applicant's Handbook 12.4; St. John's River Water Management District Applicant's Handbook 12.4; Southwest Florida Water Management District Basis of Review Appendix 4; and South Florida Water Management District Basis of Review 4.4.

[38] Florida Department of Environmental Protection, Florida Wetland Regulatory Program Demonstration Project 9 (undated) (on file at ELI), at 15.

[39] A memorandum of agreement (MOA) is required between the sponsoring organization and the FLDEP or WMD, as appropriate, for any regional offsite mitigation area (ROMA) project used for five or more projects or for more than 35 acres of impact. The MOA must address most of the same requirements required by mitigation bank permits.

[40] Florida Department of Environmental Protection, supra note 58.

[41] Fl. Stat. Ann. § 373.4137.

[42] Florida Department of Environmental Protection, supra note 58.

[43] U.S. Army Corps of Engineers, Savannah District, Guidelines for the Establishment and Operation of Wetlands Mitigation Banks in Georgia, available at http://www.sas.usace.army.mil/bankguid.htm.

Hawaii (Phase II)

The State of Hawaii has not adopted legislation, regulations, or guidelines regarding wetland mitigation banking and generally defers to the Corps for jurisdictional, wetland-related, mitigation issues.

Idaho (Phase III)

Idaho has not adopted guidelines, policies, or legislation regarding wetland mitigation banking. IDEQ actively participates on an MBRT with the Walla Walla Corps District. The MBRT has developed formal guidelines for its operation.[44]

Illinois (Phase III)

In 1989, Illinois passed the Interagency Wetlands Policy Act (IWPA), which established as a state goal of achieving a no overall net loss of the existing wetland acres or functions. Under the act, all projects being pursued by a state agency or being accomplished with state funds that have the potential to adversely impact a wetland.[45] Projects must first be reviewed by the Illinois Department of Natural Resources (IDNR) to determine whether a wetland impact will occur; if it is determined there will not be an impact, the project will be approved and funds may be released. If an impact is expected to occur, the agency requesting approval must create a plan detailing how it will compensate for the impact before the project may move forward.[46]

The administrative rules of the IWPA establish guidelines for wetland compensation plans and include a set of mitigation ratios.[47] Each state agency is authorized to establish a Wetland Compensation Account "to reconcile debits and credits established as the result of Wetland Compensation Plans."[48]

The state does not, however, have legislation, regulations, or guidance on wetland mitigation banking.

[44] Personal Communication with Michael McIntyre, Idaho Department of Environmental Quality (October 30, 2006).

[45] IDNR, available at http://dnr.state.il.us/wetlands/ch4e.htm.

[46] 830 Ill. Comp. Stat. §20/1-1 et. seq.

[47] IDNR, available at http://dnr.state.il.us/wetlands/ch4e.htm

[48] 20 ILCS 830/3-3.

Indiana (Phase IV)

The Indiana Department of Environmental Management (IDEM) administers the state's isolated wetland permit program to ensure that "compensatory mitigation will offset the loss of isolated wetlands allowed by the permitting program."[49] Indiana Code outlines required standards and ratios for compensatory mitigation.[50] Further guidance is provided by two "non-rule" policy documents published by the Indiana Department of Environmental Management (IDEM) that provide information on determining when compensatory mitigation is complete and meets success criteria.[51] IDEM also has conducted an informal study of wetland mitigation success to determine whether mitigated wetlands were being constructed according to guidelines and were functioning properly.[52]

Compensatory mitigation also is required for wetland and stream impacts associated with permitted activities under the state's Lakes Preservation Act[53] and the Flood Control Act.[54,55] To provide guidance for the IDNR's compensatory mitigation activities, the state's Natural Resource Commission published guidance in the Indiana Register, which establishes "a general framework for the assessment and determination of wetlands or habitat compensatory mitigation where a construction project is likely to reduce or degrade an existing wetland or habitat."[56] In addition, the IDNR began drafting mitigation guidelines in 2006. Agency

[49] Ind. Code §13-18-22-1.

[50] Ind. Code §13-18-22-6.

[51] Indiana Department of Environmental Management, Determining when Compensatory Mitigation is Complete, Water-009-NPD (September 8, 2006), at http://www.in.gov/idem/rules/policies/water/009.pdf (last visited July 5, 2007).

[52] Personal communication with Dennis Clark, Chief, Assessment Branch, Ind. Dep't of Envtl. Mgmt. (March 9, 2006).

[53] Ind. Code §14-26-2.

[54] Ind. Code §14-28-1.

[55] Personal communication with James Ray, Ind. Dep't of Natural Res., Lake & River Enhancement Section (Feb. 28, 2007).

[56] Natural Resources Commission. Revised November 14, 2006. "Wetlands and Habitat Mitigation." Information Bulletin #17. Indiana Register. 20 IR 3546. See: http://www.in.gov/legislative/register/20061213-IR-312060562NRA.xml.pdf.

staff intend to make the guidelines an enforceable "rule document" upon completion.[57]

Under the *Interagency Coordination Agreement on Wetland Mitigation Banking within the State of Indiana,*[58] the Louisville and Detroit Districts of the Corps, USDA Natural Resources Conservation Service (NRCS), EPA, U.S. Fish and Wildlife Service (FWS), IDEM, and IDNR participate on a mitigation banking review team.[59]

Iowa (Phase III)

Under state regulations, the Iowa Department of Natural Resources (IDNR) may not issue a certification for a protected wetland unless "the protected wetland is replaced by the applicant with a wetland of equal or greater value as determined by the department."[60] The regulations do not specify exactly how mitigation should be achieved, and so the method, type, and location of mitigation vary from project to project. Iowa has not adopted mitigation banking legislation or regulations.

The Iowa Department of Transportation released a study in 2006 that outlines a framework for an Iowa Wetland Mitigation Clearinghouse (IWMC).[61] The objective of the project was to determine whether state and local resources may be utilized cooperatively in developing shared wetland mitigation projects in ways that will benefit both Iowa agencies and local governments. The report references draft guidance developed by the Iowa MBRT on mitigation banking.

The state actively participates on an MBRT with the Rock Island District of the Corps.[62]

Kansas (Phase IV)

Kansas has not adopted wetland mitigation bank legislation, regulations, or guidance. The Kansas Department of Health and Environment serves on a Mitigation Banking Review Team for the state.[63]

A Stream Mitigation Task Force,[64] comprised of state and federal wetland agencies, is developing stream mitigation guidelines for use by the state and the Corps.[65]

Kentucky (Phase III)

In July 2000, the Kentucky Legislature passed KRS 150.255, which gave the department the authority to establish and manage wetland or stream compensatory mitigation banks.[66] The legislation also established the Kentucky Wetland and Stream Mitigation Fund, an in-lieu fee program.

In 1993, a variety of federal and state agencies jointly prepared *Wetland Compensatory Mitigation and Monitoring Plan Guidelines for Kentucky* (Kentucky Guidelines). The participating agencies included the Louisville Corps District, U.S. Fish and Wildlife Service Region IV, U.S. Environmental Protection Agency Region V, the Kentucky Department for Environmental Protection - Division of Water (KDOW), and Kentucky Department of Fish and Wildlife Resources. The Guidelines were developed to assist applicants with the creation of mitigation and monitoring plans for projects requiring a §404 permit and §401 certification.[67] The

[57] Personal communication with Jon Eggen, Ind. Dep't of Natural Res. (March 8, 2007).

[58] Interagency Coordination Agreement on Wetland Mitigation Banking in the state of Indiana , at http://www.in.gov/idem/programs/water/401/indica1002.pdf (last visited July 5, 2007).

[59] Personal communication with Marylou Renshaw, Watershed Planning Branch in the Office of Water Quality, Ind. Dep't of Envtl. Mgmt., (Feb. 23, 2007).

[60] Iowa Code § 456B.13(2)(a).

[61] Smith, Duane and Steve Andrle, Dennis Kroeger. November 2006. "Smart Wetlands Mitigation for Iowa Department of Transportation Projects." Iowa Department of Transportation. http://www.ctre.iastate.edu/reports/wetlands_mitigation.pdf.

[62] Personal Communication with Christine Schwake, Iowa Department of Natural Resources (December 8, 2005).

[63] Personal Communication with Scott Satterthwaite, Kan. Dep't of Health and the Env't (Nov. 17, 2006).

[64] The task force is comprised of the Army Corps of Engineers and other federal agencies; state agencies including but not limited to the Kansas Department of Health and the Environment, the Department of Agriculture's Division of Water Resources, the Kansas Water Office, the Kansas Department of Wildlife and Parks, and Kansas Department of Transportation; and county and local land trusts. Satterthwaite, supra note 81.

[65] Id.

[66] Ky. Rev. Stat. Ann. §150.255. See: http://www.lrc.ky.gov/KRS/150-00/255.PDF.

[67] Kentucky Division of Water, Wetland Compensatory Mitigation and Monitoring Plan Guidelines for Kentucky, available at http://www.water.ky.gov/NR/rdonlyres/BC3F4926-1327-4965-A50C-2B1FCE01FDE5/0/Wetland_guide.pdf (last visited on Apr. 26, 2006).

KDOW has also developed stream mitigation guidelines.[68]

Louisiana (Phase III)

The Louisiana Department of Environmental Quality (LA DEQ) does not require mitigation for §401 water quality certifications above that required by the Corps under a §404 permit. However, state statutes and regulations address mitigation for impacts to wetlands in the Louisiana Coastal Zone (LCZ). Coastal Use Permit (CUP) must contain requirements for compensatory mitigation to offset any loss of wetland ecological value.[69] Compensatory mitigation can include Coastal Management Division (CMD)-approved mitigation bank credits, advanced mitigation credits, project-specific mitigation, or a monetary contribution to an approved compensatory mitigation plan or to the Louisiana Wetland Conservation and Restoration Fund when the permittee is unable to provide mitigation through an individual project or a mitigation bank.[70] The CMD serves on the Mitigation Banking Review Team for banks in the LCZ and conservation plan areas.[71]

Louisiana's mitigation regulations include stipulations for the use of mitigation banks and advanced mitigation projects.[72]

Maine (Phase I)

Wetland compensation is regulated separately by the Maine Department of Environmental Protection (MDEP) and the Land Use Regulation Commission (LURC) for the lands over which they have jurisdiction.

Wetland compensation on MDEP lands

For MDEP lands, the Maine Revised Statute Annotated (MSRA) contains provisions for general mitigation measures, wetland mitigation banking, and in-lieu-fee mitigation, stating that "[the MDEP] may require that compensation include the design, implementation and maintenance of a compensation projector, in lieu of such a project, may allow the applicant to purchase credits from a mitigation bank or to pay a compensation fee."[73]

The state's regulations specify that the goal of compensation is to "achieve no net loss of wetland functions and values."[74] A functional assessment is required in order to better understand the functions of the impacted wetlands. The regulations establish a preference for mitigation to be located on-site or as close as necessary to offset direct impacts. It may, however, be placed off-site where it will satisfy wetland priority needs as established at the local, regional, or state level. The regulations allow for mitigation requirements to be met through restoration, enhancement, preservation, or creation of wetlands, and more than one type of compensation may be allowed for a single project. The rules also establish replacement ratios: 1:1 for restoration, enhancement, or creation for impacts in wetlands not of special significance;[75] 2:1 for restoration, enhancement, or creation for impacts in wetlands of special significance; and 8:1 for compensation in the form of preservation.

[68] Kentucky Division of Water, Draft Stream Mitigation Guidelines, available at http://www.water.ky.gov/NR/rdonlyres/B8FE078D-6100-4A61-93A0-A7B49A007FDC/0/New_Guidelines.pdf (last visited on Apr. 26, 2006).

[69] L.A.R.S. 49 §241.41.

[70] L.A.C. Title 43 §724.

[71] Personal communication with Jim Rives, Louisiana Coastal Resources Program (Oct. 11, 2006).

[72] An advanced mitigation project is a project implemented to create, restore, protect, and/or enhance wetlands for the purpose of producing ecological values, measured as average annual habitat units or cumulative habitat units (advanced mitigation credits). Such projects must be approved by the secretary prior to implementation, and the advanced mitigation credits shall have limited utility for the purpose of compensating for the ecological values lost due to a permitted activity. See L.A.C. Title 43 §724.

[73] Me. Rev. Stat. Ann. tit. 38, § 480Z.

[74] Code Me. R. 06-096, § 310(5)(C).

[75] All coastal wetlands and great ponds, and some freshwater wetlands (those that have a critically imperiled or imperiled plant community; those with significant wildlife habitat; those located near a coastal wetland, great pond, or stream; emergent marshes; wetlands with a floodplain; peatlands; and rivers, streams, or brooks) are considered wetlands of special significance. Code Me. R. 0696-4-a.

Mitigation banking regulations require that banking occur in the same watershed as the impacted wetland. Replacement ratios guide the determination of credits for compensation of proposed projects. Other provisions set functional requirements, limitations, required level of expertise for operation, terms and conditions, and application requirements.[76]

Wetland compensatory for LURC lands

LURC's Wetland Compensation Guidelines, adopted in 1998, are similar to the MDEP's regulations. The guidelines outline replacement ratios and allow for method, type, and location of compensation to vary, depending on wetland priority needs as established at the local, regional, or state level. A functional assessment is required for many projects.

Mitigation banking guidelines require that banking occur in the same watershed as the impacted wetland, and additional banking provisions establish replacement requirements, limitations, required level of expertise for operation, terms and conditions, alternatives analyses, and functional assessments.[77]

In 1998 the Maine LURC adopted "Wetland Compensation Guidelines" that include a section on wetland mitigation banking.[78]

Maryland (Phase III)

Maryland state law and regulations include general standards on mitigation, including mitigation banking and in-lieu fee mitigation.[79] The state has different regulations for impacts to streams. Wetland mitigation provisions require projects impacting more than 5,000 square feet to provide mitigation in the form of restoration, enhancement, or creation.[80] When determining the type and amount of mitigation required of the permittee, Maryland Department of Environment (MDE) prefers on-site mitigation projects. When that option is not feasible, the department evaluates off-site options, mitigation banks, and, lastly, payment into the State's Nontidal Wetland Compensation Fund, which MDE uses to conduct mitigation projects statewide.[81]

Massachusetts (Phase IV)

Massachusetts wetland regulations set forth state mitigation requirements.[82] For projects that are less than 5,000 square feet, compensation must be at the ratio of 1:1.[83] In 2004, the governor authorized the creation of a pilot wetlands mitigation bank in the Taunton River Watershed as part of the Transportation Bond Bill (Section 89 of Massachusetts Acts Chapter 291).[84] The project is being carried out by a consulting firm.[85] The purpose of the bank, in addition to offering mitigation opportunities for projects causing impacts to wetlands, is to determine if mitigation efforts can be improved by establishing large area mitigation banks with significant oversight during the planning, construction and post-construction monitoring phases.[86] The 2004 legislation also required the creation of an MBRT. The team meets monthly and includes representatives from consultancies, state agencies, federal agencies, industry, an advocacy organization, and the local community.[87]

[76] Code Me. R. 06-096, § 310(7).

[77] Maine Land Use Regulation Commission, Wetland Compensation Guidelines (1998), available at http://www.maine.gov/tools/whatsnew/attach.php?id=2811&an=1.

[78] Maine Land Use Regulation Commission. February 26, 1998. "Wetland Compensation Guidelines." http://www.maine.gov/tools/whatsnew/attach.php?id=2811&an=1.

[79] Md. Regs. Code tit. 26, § 23.04 and § 24.05.

[80] Personal Communication with Amanda Sigillito, Maryland Department of the Environment (July 25, 2006).

[81] Personal Communication with Amanda Sigillito, Maryland Department of the Environment (October 26, 2006).

[82] 310 Mass. Code Regs. 10.55(4)(b); Mass. Dep't of Envtl. Prot., Massachusetts Inland Wetland Replication Guidelines (Mar. 1, 2002) available at http://www.mass.gov/dep/water/laws/replicat.pdf; 310 Mass. Code Regs. 10.55(4)(b); Mass. Dep't of Envtl. Prot., Massachusetts Inland Wetland Replication Guidelines (Mar. 1, 2002) available at http://www.mass.gov/dep/water/laws/replicat.pdf; Personal Communication with Michael Stroman, Wetlands Program Chief, Mass. Dep't of Envtl. Mgmt. (Mar. 14, 2007).

[83] Stroman, supra note 100.

[84] Eric Las, et al., A Pilot Wetlands Mitigation Bank in the Taunton Rivershed, Association of Massachusetts Wetlands Scientists Newsletter, Oct. 2006, at 9, available at http://www.bluewavestrategies.com/pdfs/AMWSarticle.pdf.

[85] Blue Wave Strategies, Wetland Mitigation Banking, at http://www.bluewavestrategies.com/wetlands_banking.htmls (last visited July 9, 2007).

[86] Massachusetts Department of Environmental Protection, Protecting Wetlands in Massachusetts, at http://www.mass.gov/dep/water/resources/protwet.htm (last visited July 3, 2007).

[87] Blue Wave Strategies, Wetland Banking Review Team, at http://www.bluewavestrategies.com/wetlands_team.html (last visited July 9, 2007).

Michigan (Phase I)

Michigan has extensive laws, regulations, and guidelines on wetland mitigation. The state's regulations provide that mitigation should be considered only after steps have been taken to avoid and minimize impacts from a proposed activity.[88] Compensatory mitigation requirements can be satisfied through restoration of degraded wetlands (preferred), creation of wetland, acquisition of banking credits, and preservation (under certain permittable circumstances). Mitigation regulations specify that a no-net-loss of wetlands should be achieved and gives a set of ratios[89] and requirements[90] to meet this objective.

The wetland regulations establish a mitigation banking program for the state.[91] Administrative rules governing banking took effect in December 1997 and allow for the use of credits from established mitigation banks to fulfill wetland permit requirements. The Michigan Department of Environmental Quality (MDEQ) has developed a program that strives to meet several state goals, including: reducing permit processing time and costs due to increased certainty regarding the availability of adequate mitigation sites; providing for the establishment of new wetlands in advance of losses; consolidating mitigation projects into better designed and managed sites; and encouraging the integration of watershed and mitigation planning.[92] The MDEQ has also developed a mitigation banking handbook that guides the establishment of mitigation banks and agreements, provides planning and management considerations, outlines the applicability of banking credits, and establishes a procedure for determining priority wetland restoration areas within the state.[93] To date, three mitigation banks have been established throughout the state.[94]

Minnesota (Phase IV)

Wetland mitigation banking in Minnesota is authorized under state regulations that allow permittees to purchase credits from the state-operated bank sponsored by the Minnesota Board of Water and Soil Resources (MNBWSR).[95] The Minnesota Department of Natural Resources (MNDNR) public waters regulations require permit and certification applicants to demonstrate compliance with sequencing: avoid, minimize, and mitigate.[96] State regulations outline requirements for replacing impacted, including mitigation ratios.[97]

Since 1991, each Minnesota Governor has issued and reissued a State Governor's Executive Order directing state departments to operate to the fullest extent of their authority under the strict concept of "No-Net Loss" of wetlands in regards to projects under their jurisdiction. The most recent executive order was reissued in 2007.[98]

An MBRT operates in the state, usually in combination with a Technical Evaluation Panel (TEP) required under the state wetland act.[99]

[88] See MICH. ADMIN. CODE § 281.925.

[89] Restoration/creation ratios are: 5:1 for rare or imperiled wetlands; 2:1 for forested wetlands and some coastal wetlands; and 1.5:1 for all other wetlands. For preservation of wetlands as a mitigation option, the ratio of preserved wetlands to impacted wetlands should be 10:1.

[90] Mitigation should be on-site and in-kind where possible and practical. MDEQ permitting staff may adjust ratios if mitigation is to be out-of-kind or for other specific circumstances.

[91] See MICH. ADMIN. CODE § 281.951 - 281.961.

[92] Michigan Department of Environmental Quality, Wetland Mitigation Banking, at http://www.michigan.gov/deq/0,1607,7-135-3313_3687-10426--,00.html (last visited on Aug. 13, 2004).

[93] Michigan Department of Environmental Quality, MDEQ Wetland Mitigation Banking Handbook (Sept. 2001), available at http://www.deq.state.mi.us/documents/deq-water-wetlands-webhandbook.pdf.

[94] Michigan Department of Environmental Quality, Wetland Mitigation Banking Registry, at http://www.deq.state.mi.us/documents/deq-lwm-wetlands-wetlandbankregistry.pdf (last visited on Aug. 13, 2004).

[95] MINN. STAT. § 103G.2242(1).

[96] MINN. R. 6115.0240(3C)(5), 8420.0540(1), 7050.0186(2).

[97] MINN. STAT. §§ 103G.222(1)(b)(1)-(2).

[98] Personal communication with Lawrence Zdon, Minn. Pollution Control Agency (Apr. 24, 2007).

[99] A Technical Evaluation Panel is "composed of a technical professional employee of the board, a technical professional employee of the local soil and water conservation district or districts, a technical professional with expertise in water resources management appointed by the local government unit, and a technical professional employee of the Department of Natural Resources for projects affecting public waters or wetlands adjacent to public waters." See MINN. STAT. § 103G.2242(2)(a).

Mississippi (Phase IV)

The State of Mississippi has not adopted legislation, regulations, or guidance regarding wetland mitigation banking.[100]

The Mississippi Department of Environmental Quality, the Mississippi Department of Marine Resources, and the Mississippi Department of Wildlife, Fisheries and Parks are active participants on the interagency Alabama/Mississippi MBRT in coordination with the Corps' Mobile and Vicksburg Districts.[101]

Missouri (Phase I)

Missouri has not adopted legislation, regulations, or guidelines for wetland mitigation banking. The state has, however, published mitigation guidelines for compensatory mitigation generally – *State of Missouri Aquatic Resources Mitigation Guidelines.*[102] The guidelines, issued by the Missouri Department of Natural Resources (MODNR) in 1998, address avoidance and minimization of impacts; mitigation site, type, and method;[103] replacement ratios;[104] and planning.[105] The guidelines acknowledge the existence of mitigation banking as a compensatory mechanism, but do not provide any additional guidance.

Both the MODNR and the Missouri Department of Conservation (MDC) are members of the region's MBRT. The MBRT is chaired by the Missouri Natural Resources Conservation Service (NRCS) and includes representatives from the U.S. Army Corps of Engineers (St. Louis, Little Rock, Rock Island, Kansas City, and Memphis Districts), U.S. Environmental Protection Agency Region VII, and U.S. Fish and Wildlife Service.[106]

Montana (Phase II)

Montana does not have legislation, regulations, or guidance for wetland mitigation banking.

Nebraska (Phase II)

Nebraska state law gives the state highway department the authority to establish and maintain wetland to compensate for damage to wetlands from highway construction or maintenance.[107] The provision also gives the agency the authority to establish wetlands mitigation banks, but limits their size to "one hundred fifty percent of the lands reasonably expected to be necessary for the mitigation of future impact on wetlands brought about by highway construction, reconstruction, or maintenance."[108]

Nebraska does not have any regulations or guidance on wetland mitigation banking. The Nebraska Department of Environmental Quality (NDEQ) and the Nebraska Game and Parks Commission (NGPC) participate on the Nebraska MBRT, which has created a draft Standard Operating Procedure that guides wetland mitigation bank development. Other participating MBRT agencies include the Corps, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Federal Highway Administration, and Natural Resources Conservation Service. The group is also in the process of developing stream mitigation guidelines.[109]

[100] Personal Communication with Robert Seyfarth, Miss. Dep't of Envtl. Quality (Nov. 7, 2006).

[101] Seyfarth, supra note 118; Personal Communication with Jeff Clark, Miss. Dep't of Marine Res. (Nov. 2, 2006); Personal Communication with John Tindall, Miss. Dep't of Wildlife, Fisheries, and Parks (Nov. 7, 2006).

[102] Missouri Department of Natural Resources, State of Missouri Aquatic Resources Mitigation Guidelines, at http://www.dnr.mo.gov/env/wpp/401/mitigation_guidelines.pdf (1998).

[103] On-site mitigation is preferred except: where it is impractical, where it does not adequately replace lost functions, or where it is determined that off-site mitigation is environmentally preferable given the type of wetland impacted and historic losses in the watershed. Off-site mitigation should be adjacent to the impacted site and/or in the same watershed, except where it is demonstrated to be impractical. In-kind mitigation is also preferred, except where it is impractical. Acceptable mitigation methods include restoration (preferred), creation, enhancement, preservation, mitigation of non-wetland aquatic resources, in-lieu-fee, and banking. The guidelines outline circumstances under which each of these mitigation methods are acceptable.

[104] Replacement ratios for compensatory wetlands to impacted wetlands (as classified by Cowardin et al.'s Classification of Wetlands and Deepwater Habitats) include the following: 1.0:1.5 for farmed wetlands; 1.0:3.0 for emergent; 1.5:3.0 for shrub-scrub wetlands; 2.0:4.0 for wooded wetlands; and 1.0:1.0 for open water. Stream mitigation ratios are determined on a case-by-case basis.

[105] Missouri Department of Natural Resources, supra note 120.

[106] Missouri Levee and Drainage Ditch Association, Agricultural and Wetland Mitigation Banks, at http://www.mldda.org/wetlandbank.htm (last visited Aug. 20, 2004).

[107] Neb. Rev. Stat. §39-1320.

[108] Neb. Rev. Stat. §39-1320.

[109] Email from Ted LaGrange, Wetland Program Manager, Nebraska Game and Parks Commission, to Alison Rau, Environmental Law Institute, (July 1, 2005, 16:10:12 EST) (on file with author).

Nevada (Phase IV)

Nevada law authorizes county commissions to establish mitigation banks. The banks must use federal standards and are authorized to cooperate with nonprofits or public agencies.[110] The state does not have any regulations or guidance on wetland mitigation banking.

New Hampshire (Phase IV)

New Hampshire does not have legislation, regulations, or guidance on wetland mitigation banking. The state does, however, have a wetland permit program that requires applicants to demonstrate that potential impacts have been avoided to the maximum extent practicable and that any unavoidable impacts have been minimized.[111,112] For remaining impacts, state regulations require compensatory mitigation.[113]

The New Hampshire Department of Environmental Services (NHDES) was granted authority to create the state's ILF program in 2006.[114] Interim rules for the program became effective on November 18, 2006; new rules became effective on June 20, 2007.[115] Although New Hampshire currently has no mitigation banks, NHDES is holding conversations with several wetland permit applicants (large developers with both proposed impacts and potential future impacts), the Corps, and U.S. Environmental Protection Agency (EPA), to set up a unique arrangement whereby the applicants pool mitigation efforts.[116]

New Jersey (Phase II)

New Jersey's extensive mitigation requirements are outlined in the Freshwater Wetlands Protection Act (FWPA) and include provisions for type, amount, timing, location (in-kind is preferred), banking and in-lieu-fee requirements, and administrative terms.[117]

The FWPA also establishes the Mitigation Council,[118] a state in-lieu-fee program (independent of the New Jersey Department of Environmental Protection (NJDEP)) for impacts to freshwater wetlands and state open water impacts.[119] The council also reviews and approves the establishment of freshwater wetland mitigation banks in the state.[120] The bank approval process is also outlined in the rules.[121]

In the Meadowlands District, the Meadowlands Interagency Mitigation Advisory Committee (MIMAC), a group composed of representatives from the Mitigation Council, NJMC, U.S. Army Corps of Engineers (New York and Philadelphia Districts), U.S. Fish and Wildlife Service, NOAA Fisheries, and U.S. Environmental Protection Agency, coordinates all banking activities. The MIMAC was established by written agreement in 1997 and has been meeting on a monthly basis since 1998.[122]

[110] Nev. Rev. Stat. 244.388.

[111] N.H. Code Admin. R. Ann. [Envt-wt] 302.03(a).

[112] See New Hampshire Department of Environmental Services, Guidebook for Wetland Permits (2007), available at http://www.des.state.nh.us/wetlands/Guidebook/.

[113] N.H. Code Admin. R. Ann. [Envt-wt] 800, 703.02; Criteria and procedures for required compensatory mitigation plans can be found in Env-wt 801.01; Compensatory mitigation is required by N.H. Code Admin. R. Ann. [Envt-wt] 302.03.

[114] N.H. Rev. Stat. Ann. § 482-A:30, § 482-A:28.

[115] N.H. Code Admin. R. Ann. [Envt-Wt] 801.03, 803.02, 803.07, 803.8.

[116] Personal Communication with Sandy Crystall, N.H. Dep't of Envtl. Services (Feb. 5, 2007); Personal Communication with Lori Sommer, N.H. Dep't of Envtl. Services (June 29, 2007).

[117] See: N.J. Admin. Code. § 7:7A-15 et seq.

[118] The council, which meets in public bi-monthly meetings, comprises seven members, including the NJDEP Commissioner and six New Jersey citizens appointed by the Governor. The six citizens must serve a three-year term and must include: two members recommended by recognized building and development organizations, two members recommended by recognized environmental and conservation organizations, and two members from New Jersey institutions of higher learning.

[119] New Jersey Department of Environmental Protection – Land Use Regulation Program, Mitigation, at http://www.state.nj.us/dep/landuse/fww/mitigate/mcouncil.html (last updated Dec. 23, 2004).

[120] New Jersey Department of Environmental Protection – Division of Land Use Regulation, Mitigation, at http://www.state.nj.us/dep/landuse/fww/mitigate/mcouncil.html (last updated Dec. 28, 2006).

[121] N.J. Admin. Code. § 7:7A-15.

[122] Personal communication with Ross Feltes, New Jersey Meadowlands Commission (Oct. 20, 2005).

New Mexico (Phase III)

The State of New Mexico has no legislation, regulations, or guidance on wetland mitigation banking. The state does not participate in a Mitigation Banking Review Team.

New York (Phase I)

New York does not have state laws or regulations on wetland mitigation banking.

The New York Department of Environmental Conservation (DEC) has developed general mitigation guidelines for its regulatory staff.[123] The guidelines offer a framework for decision-making related to wetlands regulation and enforcement, but only briefly mention wetland mitigation banking.[124] In 2002, the DEC issued a memorandum to its field staff advising them to consider banking as mitigation option equivalent to other off-site mitigation for freshwater wetlands.[125] The DEC does not, however, support the use of banks for tidal wetlands. The state is also an active participant on the MBRT that covers activities in the New York and Buffalo Districts of the U.S. Army Corps of Engineers.[126]

The Adirondack Park Agency (APA) generally reviews mitigation plans as part of the wetlands permitting process in cases where impacts to wetlands cannot be avoided, as well as mitigation resulting from enforcement activities. In 1995, the agency adopted general mitigation guidelines that, similar to the DEC guidelines, recognize banking and in-lieu-fee as mitigation options, but do not prescribe specific methods for either.[127]

[123] New York Department of Environmental Conservation, Freshwater Wetlands Regulation - Guidelines on Compensatory Mitigation, at http://www.dec.ny.gov/docs/wildlife_pdf/wetlmit.pdf (Oct. 26, 1993).

[124] New York Department of Environmental Conservation, Freshwater Wetlands Regulation - Guidelines on Compensatory Mitigation, at http://www.dec.ny.gov/docs/wildlife_pdf/wetlmit.pdf (last visited Sept. 12, 2007).

[125] Memorandum from Patricia Riexinger, New York Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, to Natural Resource Supervisors, New York Department of Environmental Conservation (Dec. 24, 2002) (on file with author).

[126] Personal communication with Patricia Riexinger, N.Y. Dep't of Envtl. Conservation (Nov. 12, 2003).

[127] Personal communication with Dan Spada, N.Y. Adirondack Park Agency (May 10, 2004).

North Carolina (Phase I)

North Carolina has state laws and regulations that guide wetland mitigation banking in the state. The state has established a comprehensive mitigation and restoration program and operates a statewide in-lieu-fee program designed to consolidate wetland and watershed mitigation and restoration efforts. Both the North Carolina Ecosystem Enhancement Program (NCEEP) and the Division of Water Quality (DWQ) are lead state agencies for mitigation-related activities in North Carolina. DWQ is responsible for implementing the state's regulations pertaining to mitigation and works with applicants throughout the permit process, while the NCEEP provides options for parties that need to satisfy mitigation requirements.[128] The NCEEP strategy involves the development of Watershed Restoration Plans (WRPs), including the identification of Targeted Local Watersheds (TLWs) (14-digit hydrologic units) within each 8-digit U.S. Geological Survey Cataloging Unit in the state.[129] Numerous other state and federal agencies participate in the state's MBRT and the Program Assessment and Consistency Group, a state-level group that operates similarly to the MBRT to support the NCEEP.[130]

[128] Due to the stringency of the Coastal Area Management Act, the DCM does handle compensatory mitigation issues as regularly as the NCEEP and the DWQ.

[129] In 1998, the NCWRP completed Watershed Restoration Plans (WRPs) for the 17 major river basins in the state. The WRPs include restoration goals, narrative overviews of the basins, priority sub-basin maps with water quality information, watershed boundaries, land cover data, information on existing water quality problems, descriptions of priority sub-basins, and wetland impact information. See North Carolina Wetlands Restoration Program, NCWRP Watershed Restoration Plans, at http://h2o.enr.state.nc.us/wrp/plans/wetrip.htm (last revised Jan. 25, 2004). The NCEEP's Watershed Needs Assessment Team (WNAT), an interagency group composed of representatives from several state and federal agencies, developed a "screening methodology" to identify Targeted Local Watersheds (TLWs) in which to concentrate planning and restoration activities. Once TLWs have been identified through the screening methodology, the NCEEP will work with local governments, NGOs, and other stakeholders to complete local watershed plans in selected TLW areas throughout the state. See North Carolina Wetlands Restoration Program, Guide to the North Carolina Wetland Restoration Program's Watershed Restoration Strategy (April 2001), available at http://h2o.enr.state.nc.us/wrp/pdf/restplans/Planning%20Guide.pdf.

[130] Personal communication with Suzanne Klimek, N.C. Ecosystem Enhancement Program (Aug. 24, 2004).

State laws and regulations outline requirements for private mitigation. Banks must be consistent with the state's restoration priorities and must be located within an area that is identified as a priority for restoration by the NCEEP. Mitigation banking credits must follow state regulations.[131]

North Dakota (Phase IV)

North Dakota has not adopted legislation, regulations, or guidelines for wetland mitigation banking.

Ohio (Phase I)

Ohio state laws and regulations include provisions for wetland mitigation banking. State law and regulations outline compensatory mitigation provisions for the three categories of wetlands defined in the Isolated Wetlands Law and the state's water quality standards.[132] Ohio state laws outline mitigation banking requirements and replacement ratios specific to isolated wetlands.[133]

The state's compensatory mitigation rules include a prescribed set of mitigation ratios, replacement categories and mitigation location requirements.[134] On-site and in-kind mitigation is required where its impracticability cannot be demonstrated.[135] If restoration is not possible, the rules state that alternative compensatory mitigation techniques (including banking, enhancement, and preservation) may be approved on a case-by-case basis.[136]

The Ohio Environmental Protection Agency and Ohio Department of Natural Resources (ODNR) participate on the area's Mitigation Banking Review Team (MBRT), along with the U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service, and Natural Resources Conservation Service.[137] The four Corps districts with jurisdiction in the state are the Buffalo District, the Pittsburgh District, the Huntington District, and the Louisville District.

In 1999, OEPA and ODNR released the *Ohio Wetland Restoration and Mitigation Strategy Blueprint*.[138] The Blueprint lays out both a model for identification of high priority areas for protection, restoration, and mitigation and a strategy for implementation of a state wetland mitigation banking policy and state restoration goals.

Oklahoma (Phase IV)

Oklahoma has not adopted guidelines, policies, or legislation (beyond §404 requirements) concerning compensatory mitigation for permitted impacts to wetlands or streams, including banking and in-lieu-fee operations. However, the state is taking steps toward developing mitigation banks and is close to establishing a bank for the Oklahoma Department of Transportation.[139] The OCC has also established a clearinghouse for landowners wanting to engage in wetlands restoration projects.[140] Oklahoma does not participate on the state's Mitigation Banking Review Team.[141]

Oregon (Phase II)

Oregon requires compensatory mitigation for all wetland permits and allows for mitigation to be met through on- and off-site mitigation, payment in lieu,

[131] N.C. Admin.Code tit. 02R.0302.

[132] Ohio Admin. Code § 3745-1-50.

[133] Ohio Rev. Code Ann. § 6111.027.

[134] Ohio Admin. Code § 3745-1-54.

[135] Id.

[136] Id.

[137] Ohio Dep't of Natural Res., Wetland Mitigation Banking, at http://www.dnr.state.oh.us/wetlands/banking.htm (last visited June 18, 2004).

[138] Ohio Department of Natural Resources and Ohio Environmental Protection Agency. September 1999. "Ohio Wetland Restoration & Mitigation Strategy Blueprint."

http://www.dnr.state.oh.us/Home/Nature/wetlands/strategy/tabid/5635/Default.aspx.

[139] Guided by a memorandum of agreement written in 1996, signatories of the memorandum, the Tulsa District of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, Natural Resources Conservation Service, Federal Highway Administration, Oklahoma Department of Transportation, Oklahoma's Office of the Secretary of the Environment, OCC, and the ODWC, along with the ODEQ and the Nature Conservancy, drafted a banking instrument, but the bank has yet to be finalized. DuBois, supra note 10.

[140] Oklahoma Conservation Commission, Wetland Registry for Landowners, at http://www.okcc.state.ok.us/Wetlands/wetlands_registry.htm (last visited July 5, 2007).

[141] Personal communication with Chris DuBois, Wetland Programs Coordinator, Okla. Conservation Comm'n (Jan. 11, 2007).

and mitigation banking.[142] State rules establish wetland replacement ratios for compensatory mitigation, which apply to both compensatory mitigation and mitigation banks.[143] For unique habitats, such as vernal pools, Oregon Department of State Lakes (ODSL) may consider conservation instead of mitigation banking.[144] In-lieu-fee payment is also an option for compensatory mitigation in Oregon.[145]

The Oregon Mitigation Bank Act of 1987 established a mitigation banking program administered by the ODSL.[146] ODSL produced a "Wetland Mitigation Guidebook for Oregon" in 2000.[147]

Oregon actively participates in MBRTs in coordination with the Portland District of the U.S. Army Corps of Engineers. The ODSL and the Corps jointly chair the MBRT, which also consists of representatives from Oregon Department of Environmental Quality, Oregon Department of Land Conservation and Development, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, EPA, Soil and Water Conservation Districts, and local government planners.[148]

Pennsylvania (Phase I)

Pennsylvania does not have legislation, regulations, or guidance on wetland mitigation banking.

Wetlands are regulated under Pennsylvania's Dam Safety and Encroachments Act.[149] The act defines a "body of water" as "[a]ny natural or artificial lake, pond, reservoir, swamp, marsh, or wetland."[150] Corresponding rules and regulations ("Chapter 105") outline "wetland replacement criteria," acreage and functional replacement requirements,[151] and siting requirements.[152] The Pennsylvania Department of Environmental Protection (PADEP) has also developed guidelines, *Design Criteria for Wetlands Replacement*. The guidelines, written to provide "design, flexibility, and utilization of the best available technology in environmental engineering," give a general overview of mitigation objectives and provide guidance for site selection and construction.[153]

The state participates on an MBRT along with the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Pennsylvania Department of Transportation, Pennsylvania Fish and Boat Commission, Natural Resources Conservation Service, Federal Highway Administration, and the Baltimore, Philadelphia, and Pittsburgh Districts of the U.S. Army Corps of Engineers. The MBRT established 33 wetland mitigation banking service areas, emphasizing a watershed approach in banking-related decision-making.[154] At present, PennDOT is the only organization in the state that operates wetland mitigation banks.

Rhode Island (Phase II)

Rhode Island does not have legislation, regulations, or guidance on wetland mitigation banking.

The state's Department of Environmental Management's (RIDEM) rules and regulations include strict avoidance and minimization provisions. RIDEM does not have formal guidelines on compensatory mitigation. The Rhode Island Coastal Resources Management Council (RICRMC) has adopted compensatory mitigation requirements for coastal wetlands.[155] To fulfill its "no net loss" policy,[156] RICRMC requires altered coastal wetlands to be replaced by wetlands of a similar type that provide an ecological value equal to or greater than that of the altered wetland. The rules

[142] Or. Admin. R. § 141-085-0115 (2) and O.A.R. § 141-085-0400.

[143] Or. Admin. R. § 141-085-0136.

[144] Personal Communication with Dana Field, Oregon Department of State Lands (Jul. 7, 2005).

[145] Or. Rev. Stat. §§ 196-643 to 196-655.

[146] Field, supra note 162.

[147] Oregon Department of State Lands, Wetland Mitigation Banking Guidebook, at http://egov.oregon.gov/DSL/PERMITS/mit_guidebook_intro.shtml (Oct. 2000).

[148] Or. Admin. R. § 141-085-0421(8)(a).

[149] 25 PA. CODE § 93.1.

[150] 32 PA. CONS. STAT. § 693.3.

[151] 25 PA. Code § 105.20(a).

[152] 25 PA. Code § 105.20(a).

[153] 25 PA. Code § 105.20(a).

[154] Personal Communication with Ken Reisinger (Oct. 7, 2004).

[155] See: Rhode Island Coastal Resources Management Program, Activities Under Council Jurisdiction, § 300.12.E.

[156] Rhode Island Coastal Resources Management Program, Activities Under Council Jurisdiction, § 300.12.B.3.

also spell out replacement ratios[157] and explicitly prohibit monetary compensation as an acceptable form of mitigation.[158]

South Carolina (Phase IV)

South Carolina does not have legislation or regulations guiding wetland mitigation banking.

The South Carolina Department of Health and Environmental Control, South Carolina Department of Natural Resources, U.S. Army Corps of Engineer's Charleston District, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture serve on an interagency MBRT.[159] In 2002, the MBRT published *Joint State/Federal Administrative Procedures for the Establishment and Operation of Mitigation Banks in South Carolina,* which provides guidance on the development and operation of mitigation banks.[160]

South Dakota (Phase III)

South Dakota has no formal legislation, regulations, or guidance on wetland mitigation banking or compensatory mitigation.

Tennessee (Phase IV)

Tennessee does not have regulations or guidance on wetland mitigation banking. Tennessee law does, however, give the Tennessee Wildlife Resources Agency the authority to "participate in the federal wetlands mitigation banking program."[161]

The Tennessee Department of Environment and Conservation's (TDEC) Aquatic Resources Alteration Rule regulate impacts to wetlands from draining and filling and requires that the impacts be "offset by mitigation sufficient to result in no overall net loss of resource value."[162] The rules include suggested ratios for common mitigation measures.[163]

An MBRT was established in 1995. The members include the Memphis and Nashville Corps Districts, TDEC, TWRA, EPA, FWS, U.S. Department of Agriculture (USDA), Federal Highway Administration, and Tennessee Department of Transportation. The team adopted a general wetland banking memorandum of agreement (MOA), which serves as the guiding document for banking.[164,165]

Texas (Phase II)

Texas law specifies provisions for the establishment and operation of wetland mitigation banks.[166] The state does not, however, have regulations or guidance on wetland mitigation banking. State agencies also participate on an MBRT in coordination with the Fort Worth and Galveston Corps Districts.[167]

Utah (Phase II)

The State of Utah has not adopted any legislation, regulations, or guidance on wetland mitigation banking.

Vermont (Phase II)

Vermont does not have legislation, regulations, or guidance on wetland mitigation banking.

The Vermont Wetland Rules state that adverse impacts, other than minimal impacts, will not be permitted unless avoidance and minimization sequencing has been conducted. Once sequencing requirements have been met, compensation may be considered if in accordance with the rules. The rules lay out requirements for mitigation method and replacement ratios.[168]

[157] Rhode Island Coastal Resources Management Program, Activities Under Council Jurisdiction, § 300.12.F.1.

[158] Rhode Island Coastal Resources Management Program, Activities Under Council Jurisdiction, § 300.12 B.10.

[159] Personal Communication with Rheta Geddings, Dep't of Health and Envtl. Control, Bureau of Water (Mar. 15, 2007).

[160] US Army Corps of Eng'rs – Charleston District, Regulatory Division, Standard Operating Procedures for Compensatory Mitigation (2002), available at http://www.sac.usace.army.mil/?action=mitigation.home (follow "2002 Compensatory Mitigation SOP" hyperlink).

[161] Tenn. Code Ann. §70-1-302(e).

[162] Tenn. Comp. R. & Regs. 1200-4-7-.04 (c).

[163] Tenn. Comp. R. & Regs. 1200-4-7-.04.

[164] Fed. Highway Admin.; Dep't of the Army et al., General Wetland Banking Memorandum of Agreement (June 12, 1995) (on file with author).

[165] Personal Communication with Mike Lee, Tenn. Dep't of Env't and Conservation (January 9, 2007).

[166] V. Tex. Code Ann., Tex. Nat. Res. Code § 221.001 et seq.

[167] Personal communication with Tom Calnan, Texas General Land Office (Summer 2005).

[168] Vermont Wetland Rules § 8.5(c).

Virginia (Phase III)

Virginia law authorizes the purchase of wetland mitigation bank credits to meet the compensatory mitigation requirements of the state Water Protection Permit program.[169] Wetland mitigation bank may be used if they are located in the same or adjacent Hydrological Unit Code as the impacted site, are ecologically preferable to practicable on-site and off-site mitigation options, and if the banking instrument has been approved by a process that included public review and comment.[170]

Parallel regulations guide wetland mitigation banking in tidal wetlands of the state[171] and the purchase of mitigation bank credits by the Virginia Department of Transportation.[172]

The Virginia MBRT is comprised of representatives from the Corps, EPA, U.S. Fish and Wildlife Service, VA DEQ, Virginia Department of Game and Inland Fisheries, Virginia Marine Resources Commission, and Virginia Institute of Marine Science.[173] VA DEQ and the Corps take the lead on nontidal mitigation banking permits, while the VMRC and Corps take the lead on tidal mitigation banks. Additional guidelines for proposing mitigation banks have been developed jointly by the VA DEQ and the Corps Norfolk District.[174] Finally, the VA DEQ, in collaboration with the Corps, EPA, and FWS, has also developed a template to assist in developing a mitigation banking instrument.[175]

Virginia State Water Control Law requires that permits contain compensatory mitigation requirements for impacts to wetlands that are sufficient to achieve "no net loss" of existing wetland acreage and function.[176]

The Virginia Water Protection (VWP) permit regulations defines mitigation as "sequentially avoiding and minimizing impacts to the extent practicable, and then compensating for remaining unavoidable impacts on wetlands."[177]

The VA DEQ and Corps Norfolk District have prepared a Wetland Mitigation Checklist,[178] as well as technical guidelines[179] that include information on site design, example permit conditions for compensation, monitoring report criteria, and mitigation site compliance. The Virginia Marine Resources Commission (VMRC) has also prepared a wetland mitigation policy and supplemental guidelines. The policy encourages the compensation of all permitted impacts to tidal wetlands, provided that all measures have been taken avoid impact. Mitigation must be dedicated to wetland creation and restoration and can include compensation on-site, compensation in the watershed, or compensation through an approved mitigation bank or in-lieu-fee program.[180]

Washington State (Phase I)

The 1998 Washington State Legislature passed a wetland mitigation banking law that directed consistency with federal guidance on mitigation banking.[181] The bill provided for two full time equivalents (FTEs) over two years to develop state regulations for mitigation banking and one FTE after the regulations were adopted.[182] A draft rule for the certification of mitigation banks was developed and, in November 2001, issued for comment. However, funding cuts have prevented implementation of the rule to date. The proposed rule was withdrawn on May 30, 2002. In June 2002, the

[169] Vir. Code Ann. §62.1-44.23.

[170] Vir. Code Ann. §62.1-44.23.

[171] Vir. Code Ann. § 28.2-1308.

[172] Vir. Code Ann. § 33.1-223.2:1.

[173] Personal communication with Catherine Harold and Brenda Winn, Virginia Department of Environmental Quality (July 26, 2006).

[174] Virginia Department of Environmental Quality, Suggestions for Proposing Mitigation Banks, available at http:// www.deq.virginia.gov/wetlands/pdf/mitigation.pdf.

[175] Virginia Department of Environmental Quality, Template Mitigation Banking Instrument, available at http:// www.deq.virginia.gov/wetlands/pdf/finalMBItemplateMay2004.pdf.

[176] §62.1-44.15:5D Code of Virginia.

[177] 9 VAC 25-210-10.

[178] Norfolk District Corps and Virginia Department of Environmental Quality Wetland Mitigation Checklist. available at http://www.deq.virginia.gov/wetlands/pdf/mitigationchecklistjuly2004.pdf.

[179] Norfolk District Corps and Virginia Department of Environmental Quality Recommendations for Wetland Compensatory Mitigation, available at http://www.deq.virginia.gov/wetlands/pdf/mitigationrecommendabbrevjuly2004.pdf.

[180] 4 VAC 20-390-10 et. seq. See http://www.mrc.state.va.us/regulations/fr390.shtm.

[181] Wash. Rev. Code § 90.84.

[182] Personal communication with Andy McMillan, Washington State Department of Ecology (Jan. 14, 2004).

wetland mitigation banking program was placed on hold because the staff position that was leading the rulemaking effort was cut due to budget shortfalls.[183] The 2004 Washington Legislature funded a one-year project to develop a pilot rule and work with banking interests to review mitigation bank proposals under the pilot rule.

In 1996, the state legislature passed the Aquatic Resources Mitigation Act which states that "it is the policy of the state to authorize innovative mitigation measures by requiring state regulatory agencies to consider mitigation proposals for infrastructure projects that are timed, designed, and located in a manner to provide equal or better biological functions and values compared to traditional on-site, in-kind mitigation proposals."[184] The *State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting Requirements from the Departments of Ecology and Fish and Wildlife,* published in 2000, provides interagency policy guidance for evaluating aquatic mitigation alternatives. The guidance is intended to represent consensus on mitigation policy among the agencies responsible for evaluating, approving, implementing, and enforcing aquatic resource mitigation. Ecology is also developing a *Wetland Compensatory Mitigation Guidance Document* to provide clear guidance on requirements and expectations for compensatory mitigation specific to wetlands. The state's Department of Transportation has also published mitigation guidelines, entitled *Success Standards for Wetland Mitigation Projects – A Guideline.*[185]

The Washington State Department of Transportation (WSDOT) is collaborating with the Washington State Department of Fish and Wildlife (WDFW) and the Department of Ecology to develop a "Watershed-Based Mitigation" program to guide mitigation projects for unavoidable impacts of transportation projects. The program focuses on improving ecological benefits to watersheds and streamlining the permitting process.[186] Through a "watershed characterization" process, the WSDOT assesses current conditions in watersheds and identifies possible mitigation sites to maximize ecological benefit to the watershed, achieve locally defined watershed recovery priorities, and reduce mitigation costs. The process involves an interdisciplinary team of scientists who make extensive use of geographic information systems technology. The team generates a list of potential mitigation sites in the impact area's watershed, which is then subjected to a cost-benefit analysis before a final decision on the location of mitigation projects.[187]

West Virginia (Phase II)

West Virginia does not have any legislation, regulations, or guidance on wetland mitigation banking.

Compensatory mitigation provisions are outlined in the state's water quality certification rules.[188,189] The rules lay out the state's position on the location and type of compensation required,[190] replacement ratios,[191] and mitigation methods.[192]

Wisconsin (Phase II)

State law directs the state Department of Natural Resources (DNR) to promulgate rules to define the conditions under which credits from a wetlands miti-

[183] Wash. St. Reg. 02-12-058.

[184] WASH. REV. CODE § 90.74.

[185] Washington State Department of Transportation, Success Standards for Wetland Mitigation Projects – A Guideline (1999), available at http://www.wsdot.wa.gov/environment/biology/docs/success_guidelines.pdf.

[186] Washington Department of Transportation, Environmental Services, Watershed Based Mitigation, at http://www.wsdot.wa.gov/environment/watershed/watershed_mitigation.htm (last revised 2001).

[187] Washington Department of Transportation, Identification of Mitigation Sites Through Watershed Characterization, available at http://www.wsdot.wa.gov/environment/streamlineact/subcommittee_docs/watershed_characterization_overview.pdf(last visited July 24, 2004).

[188] See W. VA. CODE ST. R. § 47-5A-6.

[189] West Virginia also requires mitigation for surface coal mining operations that affect more than 250 acres of watershed. Mitigation for temporary impacts is discretionary. W. Va. Code § 22-11-7a. It should be noted that this section was recently amended by the 2005 West Virginia Act 110 to remove the mitigation requirement for "isolated waters" and to provide credit for mitigation as a component of a required federal permit.

[190] W. VA. CODE ST. R. § 47-5A-6.2.a.

[191] W. VA. CODE ST. R. § 47-5A-6.2.c.

[192] W. VA. CODE ST. R. § 47-5A-6.2.6.c.

gation bank may be used to satisfy wetland compensatory mitigation requirements.[193] The legislation also directs the DNR to develop an MOA with the U.S. Army Corps of Engineers establishing guidelines for wetland mitigation banks.[194] The law also requires wetland mitigation bankers to grant a conservation easement to the DNR, "to ensure that the wetland will not be destroyed or substantially degraded" by future landowners.[195]

Rules issued by the DNR further establish procedures and standards for the establishment and maintenance of mitigation banks.[196] The state holds a Memorandum of Agreement (MOA) with the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service on compensatory mitigation review procedures and coordination among agencies.[197]

The same provisions out line the requirements that guide compensatory mitigation in the state.[198]

Wyoming (Phase III)

The Wyoming Wetlands Act established a mitigation banking program in the state. General standards for the program are included in the water quality rules and regulations[199] and in guidelines published by Wyoming Department of Environmental Quality (WDEQ).[200] WDEQ considers wetland functions and the "wetland value"[201] of the disturbed wetland when defining adequate mitigation and allows for the option of wetland banking.[202, 203] As described in WDEQ banking guidelines, Wyoming uses the "open banking concept," i.e., anyone who voluntary undertakes wetland creation, restoration, or an enhancement project can receive state credit. WDEQ records what and how much was built so that someone else can use the project to fulfill mitigation requirements in the future. Credits are tied to the property.[204, 205]

[193] Wisc. Stats. 281.37(2)(3)(b).

[194] Wisc. Stats. 281.37(2)(4).

[195] Wisc. Stats. 281.37(2).

[196] Wisc. Admin. Code § NR 350.01 – 350.14.

[197] Memorandum of Agreement Concerning the Adoption of Guidelines for Wetland Compensatory Mitigation in Wisconsin (2002) (available at http://www.dnr.state.wi.us/org/water/fhp/wetlands/mitigation/documents/mitigation_moa.pdf).

[198] Wisc. Stats. § 281.37; Wisc. Admin. Code § NR 350.

[199] Ch. 1 of Wyoming Water Quality Rules and Regulations § 12.

[200] Personal Communication with Bill DiRienzo, Wyoming Department of Environmental Quality (July 21, 2006).

[201] "'Wetland value' means those socially significant attributes of wetlands such as uniqueness, heritage, recreation, aesthetics and a variety of economic values." Ch. 1 of Water Quality Rules and Regulations, § 2.

[202] DiRienzo, supra note 218.

[203] Ch. 1 of Wyoming Water Quality Rules and Regulations, § 12.

[204] DiRienzo, supra note 218.

[205] Wyoming Department of Environmental Quality, Wyoming Wetland Bank: Application for Credit (undated). On file with author.

Appendix F
State Wetland Restoration Prioritization Programs

At least eight states and two counties in Alabama have established programs that seek to identify and/or prioritize wetland acreage in their states for its restoration potential. These states include Arkansas, Florida, Georgia, Maryland, Minnesota, North Carolina, Ohio, and Washington State. Although many of the state wildlife action plans identify wetland habitat, most of the acreage that is identified retains much of its functional capacity and therefore offers little opportunity to the mitigation banker to provide functional "lift" through wetland restoration and generate significant wetland credits for banking. State restoration prioritization programs, such as those discussed below, provide an opportunity to include wetlands with high wildlife habitat potential in the state wildlife action plans. See Appendix E for descriptions of these state programs.

Alabama Coastal Mapping

Several state and federal agencies in Alabama[1] have undertaken a joint project to map wetlands and submerged aquatic vegetation (SAV) in the coastal counties of Mobile and Baldwin. The groups completed mapping the SAV in 2002.[2] In September 2005, the Mobile Bay National Estuary Program published "Historical SAV Distribution in the Mobile Bay National Estuary Program Area and Ranking Analysis of Potential SAV Restoration Sites," which compares the distribution of historic SAV to the current survey to identify areas of major change and to provide a guide for restoration.[3]

Arkansas Multi-Agency Wetland Planning Team

The Arkansas Multi-Agency Wetland Planning Team (MAWPT), a consortium of six state agencies,[4] was established in the mid-1990s to address non-regulatory wetland planning and conservation issues in the state. Among its many initiatives, MAWPT has conducted a state wetland inventory, a wetland prioritization model based on geographic information systems (GIS), a wetland classification and characterization database, and a wetland planning database. The project has worked to identify priority wetland protection and restoration sites based on the characteristics, distribution, and function of the state's existing wetlands.

Through GIS analysis, priority areas for restoration and protection are identified on a watershed or regional basis. The prioritization tool will be user-friendly and applicable as a landscape assessment GIS tool. The tools are intended for regulatory use (e.g. siting mitigation banks) and non-regulatory use (e.g. prioritizing lands for restoration).[5] MAWPT also anticipates that these decision support tools will be used in siting wetland mitigation banks.[6]

See: http://www.mawpt.org/.

Florida Wetland Restoration Information Center

The goal of the Florida Wetland Information Center, which is housed within the Florida Department of Environmental Protection, is to develop the framework for a statewide ecological restoration program for wetlands and their associated uplands using ecosystem management and ecological principles.

The Center has developed the program's database to identify lands in need of funding for restoration.

See: http://www.dep.state.fl.us/water/wetlands/feri/index.htm.

[1] Mobile Bay National Estuary Program, Alabama Department of Conservation and Natural Resource's State Lands Division, and the Alabama Department of Environmental Management's Coastal Program.

[2] Personal communication with Carl Ferraro, Alabama Department of Conservation and Natural Resources (July 28, 2006).

[3] Barry A. Vittor & Associates, Inc., Historical SAV Distribution in the Mobile Bay National Estuary Program Area and Ranking Analysis of Potential SAV Restoration Sites, available at http://www.mobilebaynep.com/site/news_pubs/news/Documents/NEP_historic-SAV.pdf (last accessed November 13, 2007).

[4] Arkansas Natural Heritage Commission, Arkansas Game and Fish Commission, Arkansas Department of Environmental Quality, Arkansas Soil and Water Conservation Commission, Arkansas Forestry Commission, and University of Arkansas Cooperative Extension Service.

[5] Personal Communication with Ken Brazil and Kenneth Colbert, Arkansas Soil and Water Conservation Commission (Feb. 25, 2004).

[6] Personal Communication with Ken Brazil and Kenneth Colbert, Arkansas Soil and Water Conservation Commission (Feb. 25, 2004).

Georgia

Georgia Department of Natural Resources (DNR) is working with the University of Georgia to map high priority wetland habitats in the state for restoration, acquisition, and mitigation purposes. The Environmental Protection Division, in a project funded by the U.S. Environmental Protection Agency, seeks to map high priority wetland habitats in the state for conservation, acquisition, and mitigation purposes and to assess needs for the state to assume the §404 program. Mapping is expected to be complete in 2008.[7]

Maryland

The Maryland Department of the Environment (MDE) recently completed a project funded by EPA to prioritize wetland areas for restoration, preservation, and mitigation in the state. Published in May 2006, the report includes management and restoration recommendations based on input from counties, state agencies, and other interested parties.[8] MDE is now promoting the use of the project's findings among permit applicants seeking mitigation sites.

See: http://www.mde.state.md.us/Programs/WaterPrograms/Wetlands_Waterways/about_wetlands/prioritizingareas.asp.

Minnesota

In 2007, five Minnesota state agencies (Board of Water and Soil Resources, Department of Natural Resources, Department of Agriculture, Department of Transportation, Pollution Control Agency) launched an initiative to develop a comprehensive wetland restoration strategy with a sharper focus on action and effectiveness. The project seeks to define restoration priorities and objectives for wetland types, diversity, and complexes; regional distinctions; and timeframes. One of the intended results of the program is to provide more quality habitat for permanent and seasonal fish and wildlife and for endangered species.[9]

See: http://www.dnr.state.mn.us/nrplanning/wrs/index.html.

North Carolina Ecosystem Enhancement Program

North Carolina has built a comprehensive mitigation and restoration program for the state and operates a statewide in-lieu-fee program designed to consolidate wetland and watershed mitigation and restoration efforts. The primary goals of the North Carolina Ecosystem Enhancement Program (NCEEP) are to provide high quality, up-front compensatory mitigation for unavoidable impacts to aquatic resources and to incorporate compensatory mitigation projects into comprehensive watershed restoration initiatives.

NCEEP has developed Watershed Restoration Plans (WRPs) for each of the state's watersheds and has identified Targeted Local Watersheds (TLWs) (14-digit hydrologic units).[10] NCEEP operates the state's in-lieu-fee program,[11] accepting payments and performing mitigation on behalf of permit applicants who must compensate for impacts to wetlands or riparian buf-

[7] Personal communication with Jon Ambrose, Georgia Department of Natural Resources (Apr. 27, 2007); Personal communication with Alice Keyes, Ga. Dep't of Natural Res. (Apr. 27, 2007).

[8] Maryland Department of the Environment. "Prioritizing Areas For Wetland Restoration, Preservation, And Mitigation." http://www.mde.state.md.us/Programs/WaterPrograms/Wetlands_Waterways/about_wetlands/prioritizingareas.asp (last accessed Oct. 16, 2006).

[9] See: http://www.dnr.state.mn.us/nrplanning/wrs/index.html.

[10] In 1998, the NCWRP completed Watershed Restoration Plans (WRPs) for the 17 major river basins in the state. The WRPs include restoration goals, narrative overviews of the basins, priority sub-basin maps with water quality information, watershed boundaries, land cover data, information on existing water quality problems, descriptions of priority sub-basins, and wetland impact information. *See* North Carolina Wetlands Restoration Program, *NCWRP Watershed Restoration Plans, at* http://h2o.enr.state.nc.us/wrp/plans/wetrip.htm (last revised Jan. 25, 2004). The NCEEP's Watershed Needs Assessment Team (WNAT), an interagency group composed of representatives from several state and federal agencies, developed a "screening methodology" to identify Targeted Local Watersheds (TLWs) in which to concentrate planning and restoration activities. Once TLWs have been identified through the screening methodology, the NCEEP will work with local governments, NGOs, and other stakeholders to complete local watershed plans in selected TLW areas throughout the state. *See* North Carolina Wetlands Restoration Program, *Guide to the North Carolina Wetland Restoration Program's Watershed Restoration Strategy* (April 2001), *available at* http://h2o.enr.state.nc.us/wrp/pdf/restplans/Planning%20Guide.pdf.

[11] N.C. Admin. Code tit.15A, r. 02R.400.

fers.[12] By consolidating the mitigation requirements of multiple small projects, the NCEEP is able to implement large-scale watershed restoration efforts that address significant water quality problems.[13] State regulations dictate that mitigation banks must be located within TLWs or otherwise be proven to be consistent with WRPs.[14]

See: http://www.nceep.net/.

Ohio Wetland Restoration and Mitigation Strategy Blueprint

The Ohio Environmental Protection Agency (OEPA) and Ohio Department of Natural Resources (ODNR), worked together under grant from EPA to develop the Ohio Wetland Restoration and Mitigation Strategy Blueprint in 1999.[15] The goal of the project was to develop a plan that identified priority areas throughout Ohio for the development of wetland mitigation and restoration projects and identified high quality wetland areas statewide. The Blueprint lays out both a model for identification of high priority areas for protection, restoration, and mitigation and a strategy for implementation of a state wetland mitigation banking policy and state restoration goals.[16]

See: http://www.dnr.state.oh.us/dnap/wetlands/restoration/tabid/1003/Default.aspx.

Washington State Watershed-Based Mitigation Program

The Washington State Department of Transportation (WSDOT) is working in collaboration the Washington Department of Fish and Wildlife and the Department of Ecology to develop a "Watershed-Based Mitigation" program to guide mitigation projects for unavoidable impacts of transportation projects.[17] Through a "watershed characterization" process, the WSDOT assesses current conditions in watersheds and identifies possible mitigation sites to maximize ecological benefit to the watershed, achieve locally defined watershed recovery priorities, and reduce mitigation costs. The process involves an interdisciplinary team of scientists who make extensive use of geographic information systems technology. The team generates a list of potential mitigation sites in the impact area's watershed, which is then subjected to a cost-benefit analysis before a final decision on the location of mitigation projects.

See: http://www.wsdot.wa.gov/Environment/Watershed/mitigation.htm.

[12] The NCWRP uses the following fee schedule to determine how much a permit applicant must pay into the DENR Wetlands Trust Fund to fulfill their compensatory mitigation requirements: for impacts to surface waters other than wetlands, the cost is currently $205 per linear foot of stream; for impacts to wetlands, the cost is $12,000 per acre for non-riparian wetlands and $24,000 per acre for riparian wetlands; for impacts to salt water wetlands, the cost is $120,000 per acre. Fees, which may be adjusted annually to represent actual mitigation costs and to account for inflation, are based on the acres and types of compensatory mitigation specified in the approved certifications issued by the DWQ and on the permits or authorizations issued by the Corps. *See* North Carolina Ecosystem Enhancement Program, *EEP Schedule of Fees, at* http://www.nceep.net/pages/fee.htm (last visited Dec. 3, 2004).

[13] N.C. GEN. STAT. §143-214.8-143-214.13.

[14] North Carolina Wetlands Restoration Program, *NCWRP Watershed Restoration Plans, at* http://h2o.enr.state.nc.us/wrp/plans/wetrip.htm (last revised Jan. 25, 2004); North Carolina Wetlands Restoration Program, *Guide to the North Carolina Wetland Restoration Program's Watershed Restoration Strategy* (April 2001), *available at* http://h2o.enr.state.nc.us/wrp/pdf/restplans/Planning%20Guide.pdf.

[15] Ohio Department of Natural Resources and Ohio Environmental Protection Agency, *Ohio Wetland Restoration and Mitigation Strategy Blueprint, at* http://www.dnr.state.oh.us/wetlands/pdf/owrmsb.pdf (Aug. 5, 1999).

[16] Personal communication with Randy Bournique, Ohio Envtl. Prot. Agency (Nov. 6, 2003).

[17] Washington Department of Transportation, Environmental Services. "Watershed Based Mitigation." http://www.wsdot.wa.gov/Environment/Watershed/mitigation.htm (last revised November 13, 2007). See also: Transportation Permit Efficiency and Accountability Committee, Watershed Mitigation Subcommittee. "Watershed Mitigation." http://www.ora.wa.gov/spotlight-series/TPEAC/library.htm#Watershed (last visited November 13, 2007).

Appendix G
Bibliography of Studies on the Administrative and Ecological Performance of Banking

WETLAND MITIGATION BANKING: SUMMARY CHART

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Allen and Feddema (1996) – From Ambrose (2000)	California	Examined 75 southern California wetland mitigation sites.	42 percent of sites were 100 percent compliant.	55 percent of projects were successful or mostly successful compared to reference sites, 13 percent were half successful, 6.7 percent were unsuccessful, 10.7 percent were not constructed, 6.7 percent were not initiated, 8 percent did not require mitigation. 191 acres of mitigation served 199 acres of impacts.	
Ambrose et al. (2006)	California	Evaluation of 143 permit files (129 for compliance and wetland condition, and 14 more for compliance only) distributed among 12 regional water quality board regions and sub-regions across the state of California. The purpose was to evaluate compliance with permit conditions (including acreage requirements) and wetland condition of mitigation projects associated with Section 401 water quality certifications, and whether the mitigation acreage actually replaced those lost through permitted impacts. (75 percent project specific mitigation, 25 percent banks or ILF).	The average compliance score (mean of the compliance scores for all permit conditions) for 401 conditions was 84 percent. 46 percent of permits had 100 percent compliance. The average percent of permit conditions met completely was 73 percent. The average compliance score for mitigation plan requirements was 81 percent, while the average percent of requirements met was 67.6 percent. Permittees generally complied with acreage requirements or third party credit purchases, but less so with monitoring and submission requirements. Approximately 217 acres of impact were permitted, 445 acres of mitigation were required, 417 acres were actually built. 39 percent of files resulted in acreage loss, 47 percent resulted in net loss of jurisdictional acreage, 28 percent had net wetland losses.	Mitigation sites scored lower than reference wetlands (using a CRAM assessment methodology). In comparison to reference sites, only 19 percent of mitigation sites were classified as optimal, over 50 percent were sub-optimal, and about 25 percent were marginal to poor. Overall, 27 percent of the constructed mitigation was non-jurisdictional.	Talks about the importance of buffers for wildlife.
Ambrose and Lee (2004)	California	Evaluated 84 compensatory mitigation sites for permit compliance and 79 of these sites for wetland functions in Ventura and Los Angeles Counties (55 permit files). Permit compliance was measured by the percent of actual permit conditions and modern permit conditions met and compliance with mitigation plan. The functional assessment was conducted using the California Rapid Assessment Method (CRAM), (evaluated success of mitigation, plant/habitat characteristics, wetland conditions and jurisdictional habitat, beneficial services).	About 69 percent of sites complied with 100 percent of the permit conditions, but 70 percent of the sites had compliance of 70 percent or higher. Only one site did not comply with any conditions. 67 percent of sites achieved compliance with the mitigation plan. Conditions relating to long-term maintenance and performance were more likely to be out of compliance, than vegetation criteria. A total of 197.57 acres of mitigation were constructed for 139.36 acres of impact, which yields a ratio of 1.62:1 (but a vast majority of the acres were enhancement, and 50 percent of the mitigation acres were non-jurisdictional riparian and upland habitat). 46 percent of sites successfully met acreage requirements, while 24 percent did not.	29 percent of the sites were marginal or poor wetland condition, 67 percent of the sites were of sub-optimal condition, 4 percent of the sites were of optimal condition. When comparing "overall functional success" (how what was accomplished at the mitigation site compares to the functinal losses at the impact site), 29 percent of sites were successful, 13 percent were partially successful, 58 percent were failures. For "overall success in achieving stated goals" 53 percent were considered successful, 13 percent were partially successful, 34 percent were failing. 66 percent of the mitigation sites did not adequately compensate for lost functions, except 53 percent of sites were considered successful at replacing flood energy dissapation service, replacement was successful for 34 percent of sites. A net loss in acres of wetlands was replaced by a net gain in riparian areas and terrestrial habitat. Only about 1/3 of the functions and services lost were replaced by mitigation - sediment accumulation, flood storage had lower replacement than flood energy dissipation, biogeochemistry and habitat services.	Wildlife habitat and connectivity was one of the assessment criteria for CRAM. Wildlife was one of the criteria used to determine success based on and assessment of services lost versus gained. Over half of the mitigation sites did not adequately compensate for wildlife habitat services lost. At 32 sites (41 percent), replacement could be considered successful , while at 30 sites (38 percent), replacement failed - Twenty five sites (32 percent) of these sites were considered extreme failures.

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Balzano et al. (2002)	New Jersey	Examined 90 mitigation sites using a wetland mitigation quality assessment (WMQA) - concurrence with approved plans, and relative quality of constructed wetlands. Scores range from 0 (low) to 1 (high). Criteria evaluated included hydrology, soils, vegetation, wildlife suitability, site characteristics, and landscape features.	On average sites concurred with 48 percent of the designs and specifications in the permit plans. The ratio of mitigation wetlands to lost wetlands is 0.78:1, a 22 percent net loss in wetland acreage. Emergent wetlands were the only type where mitigation exceeded impacts, forested wetlands achieved an average compensation ratio of 0.01:1.	The average wetland mitigation quality assessment score was 0.51 (mitigation sites on average met half of the criteria that would indicate they have the potential to function as natural wetlands over time) and the range was 0.25 to 0.83. Approximately 0.45 acres of wetlands was achieved for each acre of mitigation proposed. 92 percent of proposed emergent wetland acreage was achieved, 1 percent of forested wetland acreage was achieved. Three times the open water proposed acreage was achieved.	Wildlife suitability (evaluates habitat quality as an alternative to direct observation) was one of the assessment criteria used to evaluate the wetlands. Among all assessed criteria, wildlife suitability achieved the lowest score, 1.22 out of a possible 3. Mitigation areas often lacked structural or plant species diversity needed to support feeding or breeding requirements for wildlife. A score of 1 means there was limited protective cover, limited adjacent food sources and nesting habitat, moderate human impediments to wildlife use, limited evidences that habitat can support nesting/ breeding activity.
Brown and Lant (1999)		Examined banks that had been established by the beginning of 1996.		Found a net loss of 21,000 acres due to enhancement and preservation. Eight banks did not provide the functions required, four banks used or sold more acreage than eligible.	
Brown and Veneman (1998) – From Turner et al. (2001)	Massachusetts	Examined 84 permits and 68 sites in Massachusetts for both vegetation and more robust array of environmental parameters.	49 percent of permits complied with all permit conditions.	Plant cover and community health were similar between mitigation and reference sites, but the species composition differed -- and use by amphibians, mammals and birds was lower in mitigation sites, and replacement wetlands contained fewer species. But, bank sites had more species than reference sites.	
Brown and Veneman (2001) – From Sheldon et al. 2005		Examined 109 projects.	Of 109 projects, 43 percent were 100 percent compliant with permit conditions including installation and acreage requirements, water inputs, and 75 percent cover wetland plants.		
Cole and Shafer (2002)	Pennsylvania	Examined 23 Section 404 permits in central Penn from 1986-1999. Found that permit requirements have not changed much over the 14-year range of the permits evaluated.	60 percent met originally defined success criteria (13 of 23 files has defined performance standards); permit process appears to have resulted in net gain of 0.5 hectares per mitigation project but probably a net loss of vegetated wetlands.	Only 10 of 23 mitigation wetlands (45 percent) were of the same presumptive HGM type as the impacted wetland. Mitigation resulted in a shift from wetlands dominated by woody species to less vegetated mitigation wetlands - replacement of scrub-shrub, emergent, and forested wetlands with open water ponds or uplands. 62 percent met performance standards. 10 percent of the projects were monitored.	

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
DeWeese and Gould (1994) -- From Ambrose (2000)	San Francisco Bay Region	A qualitative review of permit compliance and ecological success on a permit compliance scale of 0-10 (10 indicating full compliance) and a ecological value rating of 0 -10 (10 indicating among the best examples of habitat type in the area) of 30 projects in San Francisco Bay Region.	Only 3 projects reviewed were 100 percent compliant, 6 were 85-99 percent compliant, 6 were 75-84 percent compliant, 12 were 45-74 percent compliant, 1 was 1-14 percent compliant, 2 were 0 percent compliant. Also, 599 acres of mitigation were required for 415 acres of impacts, but only 537.2 acres were actually created. Some of the projects may have been compliant, but there were still questions about the long-term sustainability of the site.	Of the 29 sites evaluated only 1 (3 percent) was rated to have very high value, 13 judged average or slightly above or below average, 6 well below average, 2 judged to have no value. Ecological success was correlated with permit compliance (so sites with higher ecological success had higher permit compliance). The mitigation was not replacing in kind habitat values.	
Fennessy et al. (2004)	Ohio	Study of structure and function of 9 natural and 10 mitigation sites in Ohio.		Mitigation wetlands were generally dryer. Natural wetlands had faster rates of decomposition, higher IBI scores (vegetation community composition and species richness), biomass production, soil nutrient concentrations, and plant litter concentrations, and different hydrological patterns than mitigation wetlands. There were major differences in invertebrate numbers of taxa, abundance of tolerant and specialist species, and community metrics. Amphibian communities also differed. The conclusion is that mitigation is creating a new subclass of wetlands on the landscape	
Gallihugh and Rogner (1998) – From NRC (2001)	Chicago, Illinois	Evaluate 61 permits for 128 projects.		17 percent of proposed wetland vegetation had been established, 22 percent had established vegetation other than that had been proposed. 52 percent of wetlands had excessive or unplanned open water, 9 percent had insufficient hydrology. The wetland area lost was 117 hectares, and 144 hectares was mitigated (but 29 hectares were not established, and 99 hectares had insufficient hydrology).	
Johnson et al. (2000)	Washington	Evaluated 45 projects for permit compliance.	Overall, 13 projects (29 percent) were in full compliance. Forty-two projects (93 percent) were implemented, and of those, 23 projects (55 percent) were implemented to plan. Thirty-four projects had performance standards that could be evaluated, and of those, 12 projects (35 percent) were meeting all performance standards assessable by this study.		Wildlife data were collected for each site, and wildlife habitat and usage performance standards were encountered in permit files (these were generally vague and difficult to assess). The study includes a list of all the performance standards encountered.

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Johnson et al. (2002)	Washington	Evaluated 24 mitigation projects to determine the success of the projects from an ecological perspective. Criteria included established required acreage, attained performance standards, fulfilled goals, contribution of mitigation to performance of functions, comparison of type and scale of functions between mitigation and natural sites.		Phase II found that of 24 mitigation projects studied 13 percent were fully successful, 33 percent were moderately successful, 33 percent were minimally successful, 21 percent were not successful. 65 percent of total acreage lost was replaced by creating or restoring wetlands resulting in a net loss of 24.18 acres, but 2/3 of total acreage of mitigation that was established was enhancement. 71 percent of private mitigation projects were successful, while 35 percent of public mitigation projects were judged successful. In total, 79 percent of mitigation were at least somewhat successful, 63 percent at least partially compensated for permitted wetland losses. 21 percent met performance standards.	55 percent of sites had a moderate contribution to wildlife functions. Enhancement sites had minimal contribution to wildlife function. The study concludes that mitigation sites did not do a great job at contributing to wildlife functions.
Josselyn et al. (1993) – From Ambrose (2000)	California	Evaluated restoration projects under California State Coastal Conservancy's Program.		All evaluated functions were improved at 36 percent of sites, 48 percent of sites at least one function was not approved, 1 site failed in all functions evaluated. 59 percent effective at achieving goals, 45 percent effective at producing habitat benefits, 5 percent ineffective. The majority of sites did not produce a self-sustaining ecosystem.	
Mack and Micacchion (2006)	Ohio	Evaluation of 12 Ohio wetlands mitigation banks based on biological, biogeochemical, and hydrological monitoring techniques. Assessed nearly 400 hectares. Criteria for success = maximizing areas defined as "wetland", minimizing areas of open water, having hydroperiods which mimic hydroperiods of natural wetlands, maximizing cover of perennial native hydrophytes, minimizing cover of invasive plant species, VIBI scores of 40 - 60.		Of bank area assessed, about 25 percent was not wetland. Of the wetland acreage 25 percent was poor, 58 percent was fair, 18 percent was good quality using vegetation data compared to ecoregionally calibrated scores from natural reference wetlands. For amphibian communities, amphibian community composition and quality was significantly lower at banks than natural forest, shrub, or emergent wetlands. Pond-breed salamanders and forest dependent frog species were nearly absent from banks. Of banks surveyed 3 were mostly successful, 5 were successful in some areas but failed others, 4 mostly failed.	
McEnespy and Hymanson (1997) -- From Ambrose (2000)	California	Reviewed compliance with California Coastal Commission Permits.	50 percent met 90-100 percent of the permit conditions, 4 met fewer than 32 percent of permit conditions.	6 of the 23 projects reviewed were given As (the highest grade), 6 were given Bs, 6 were given Cs, 4 Ds, and one site earned an F.	

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Michigan Department of Environmental Quality (2001)	Michigan	Evaluated 78 permits for legal compliance and biological rating and overall rating. Evaluated mitigation acreage, implementation of mitigation plan, conservation easement, submittal of as-built plan, monitoring, placement of wildlife structures, construction schedule, prohibited actions, corrective measures, and financial assurances.	18 percent were compliant with all requirements. 29 percent of permittees created the required amounts of wetlands.	Evaluated a total of 159 mitigation sties. 22 percent were successful overall, 78 percent were unsuccessful overall. 87 percent of the projects required monitoring, but only 26 percent received any type of follow-up from MDEQ staff and 43 percent of the projects were actually monitored.	Wildlife usage was one of the evaluation criteria. The wildlife questions addressed the types of wildlife habitat structures observed within the mitigation area and any evidence of wildlife use.
Minkin and Ladd (2003)	New England	60 new England mitigation sites were studied in depth.	67 percent of the mitigation projects met permit conditions. The study found an overall net loss of wetlands.	17 percent of sites were adequate functional replacements of impact sites.	Observations of wildlife usage were documented during all site visits.
Mockler et al. (1998)	Washington	Evaluated 38 projects for success in replacing lost functions. Examined vegetation survival, aerial coverage, hydrology, soil, wetland and buffer condition, wildlife habitat, invasive species.	Of 29 projects completed, 21 percent were fully compliant with performance standards, design, installation, and maintenance requirements.	One of 38 sites (3 percent) was successful in replacing functions of lost wetlands., and 97 percent were not successful. 21 percent met performance standards. Failures fell into three general categories: design (70 percent of failures had design flaws), installation (87 percent of failures had installation flaws), and maintenance (91 percent of failures had maintenance issues).	
NRC (2001)	Nationwide	Summary of key data on mitigation in U.S. based on a review a wide range of studies.	Between 70 - 76 percent of mitigation required in permits is implemented, 50 -53 percent of implemented mitigation projects meet performance requirements.	Functional equivalency of completed mitigation is about 20 percent. The percent of sites that are insufficiently monitored is 63 percent.	
Reiss et al. (2007)	Florida	Evaluate 29 mitigation banks in Florida for permit compliance and ecological condition - and the relationship between permit compliance and ecological condition. The study used several assessment protocols including Uniform Mitigation Assessment Method (UMAM), Wetland Rapid Assessment Protocol (WRAP), two HGM guidebooks, Florida Wetland Condition Index (FWCI), and Landscape Development Intensity (LDI) Index.	Success varied among banks (with age of bank, and permit conditions) -- some were very successful, some were not. Study includes a table of each bank's status.	70 percent of the sites fell within the moderate range of function (0.7 on the UMAM or WRAP scale -- 0 -1.0); 45 percent of these sites were 0.8 or above, and 15 percent of these sites were near optimal (a score of >0.9). However, most sites do not include restoration or enhancement so baseline conditions are in the high functional range. Many sites had limited - moderate wildlife utilization, 11 sites had optimal wildlife utilization scores (WRAP).	Nine banks had no detail on wildlife needs in their permits or technical reports, 10 banks make reference to wildlife utilization in success criteria, 12 banks had some sort of qualitative wildlife monitoring, 7 banks had quantitative wildlife monitoring requirements (2 of these require monitoring for listed species). Data on observed wildlife and evidence of wildlife were collected for ecological assessments., but it was not apparent that baseline information on wildlife was being collected at bank sites (even though this is required under Florida law). HGM wildlife habitat scores (for 15 sites) were between 0.56 - 0.99, moderate to near optimal (scale of 0 - 1.0, mean 0.778).

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Robb (2001)	Indiana	Evaluated 31 wetland mitigation sites in Indiana to measure the area of wetland established.	34.31 hectares of mitigation were required for 13.72 hectares of lost wetlands. 15.21 hectares of wetland were actually established. However, 35 percent of mitigation sites were not constructed even though impacts occurred, and the study does not factor in violations and loss of wetlands for which no mitigation was required.	Forested areas had a failure rate of 71 percent, wet meadow areas had a failure rate of 87 percent shrub areas had a failure rate of 42 percent - and shallow emergent areas had a 17 percent failure rate and open water had a 4 percent failure rate. There was a net loss in forested wetlands -- indicating that they may be being replaced with shallow emergent and open water community types.	
Sheldon et al. (2005)	Washington	Includes a section on success of compensatory mitigation wetlands.			Includes tables on wildlife in various wetlands in Washington.
Storm and Stellini (1994) – From Sheldon et al. (2005)	Washington	Examined 17 sites for vegetation diversity, non-native plant dominance, structural diversity, wildlife use, adjacent land uses, vegetation cover vs. open water.	18 percent compliant with all requirements on development and mitigation. Compliance not determined for 53 percent of projects due to lack of information.	23 percent of sites functioned well ecologically, 65 percent functioned poorly, 12 percent were not completed. 53 percent of projects required monitoring, but only 18 percent of projects monitored the progress.	
Sudol and Ambrose (2002) -- From Ambrose et al. (2004)	California	Evaluate 55 projects based on habitat quality (vegetation, density and diversity, invasive species, tree height).	55 percent met permit conditions.	16 percent of the sites were considered successful, 58 percent were partially successful, and 26 percent were failures.	
Sudol (1996) -- From Ambrose (2000)	Orange County, California	Evaluated permit compliance of Section 404 and Section 10 permits issued in Orange County between 1979-1993 - HGM.	30 of 70 (43 percent) sites met all permit conditions, 6 sites did not meet any of their permit conditions, mitigation was not even attempted at 2 sites where it was required and at 13 sites were mitigation was not needed. For 315 acres of impacts 195 acres met permit conditions -- a success rate of 62 percent.	The results of an HGM assessment of 40 sites revealed that not a single mitigation site was judged as successful when compared to reference sites -- and that sites were generally not even in the range of reference sites. The major reason given was lack of proper hydrology at mitigation sites. 14 of the sites evaluated were partially successful.	
Turner et al. (2001)	Nationwide	Detailed analysis of peer reviewed and grey literature on the performance of wetland mitigation under §404 -- includes Sudol 1996, Allen and Feddema 1996 and DeWeese 1994.		Turner et al. estimate that of 178 hectares required for every 100 hectares of impacts annually, 134 (75 percent) are implemented, 77-104 (58-78 percent) comply with permit conditions, 16-19 hectares (20 percent) of wetland functions are compensated. Overall, the actual amount of offset is 20 percent and there is an 80 percent net loss in wetlands.	

WETLAND MITIGATION BANKING: SUMMARY CHART *(continued)*

Study	Location	Description	Results: Permit Success	Results: Ecological Success	Notes: Wildlife
Turner et al. (2001)	Nationwide	Detailed analysis of peer reviewed and grey literature on the performance of wetland mitigation under §404 -- includes Sudol 1996, Allen and Feddema 1996 and DeWeese 1994	In eight reviewed studies the proportion of mitigation initiated ranged from 28 - 100 percent. In 19 studies of permit compliance, 10 found a majority of projects to be in compliance, 9 studies found that only 4 - 49 percent of the projects were compliant. In 8 studies of 5 state permitting programs, 2 found that area of mitigation achieved equaled or exceeded the area of wetland lost, 6 found the opposite. 9 studies of 4 state permitting programs found fewer hectares of mitigation was implemented than required by permits (average of .69 hectares per hectare lost).	A review of studies on mitigation success found that 21 percent of mitigation sites met various tests of ecological equivalency to functions lost (0 - 67 percent functionality), the compliance rate for these sites was 6 - 100 percent.	
Wilson and Mitsch (1996) – From NRC (2001)		Evaluated 5 wetland projects in detail for permit compliance and function.	2 of 5 projects were in full legal compliance, four of five were on the trajectory to full compliance.	24.4 hectares were lost to impacts and 16 hectares were actually created or restored -- a net loss in wetlands.	
Zedler and Langis (1991), Zedler and Callaway (1999), Zedler et al. (1997) – From Ambrose (2000)	California	An extensive study on two mitigation projects in San Diego.		Five years after the construction the mitigation did not meet 10 of 11 ecosystem functions, but did have a fish assemblage that was comparable to wetland reference site.	
Zenter (1987) – From Ambrose (2000)	California	Qualitative examination of 63 coastal wetland restoration projects.		65 percent exhibited roughly typical wetland values as similar, unrestored wetlands.	

Bibliography

Allen, A. O., and J. J. Feddema. 1996. Wetland loss and substitution by the Section 404 Permit Program in southern California, USA. *Environmental Management* 20: 263-74.

Ambrose, R.F. 2000. Wetland Mitigation in the United States: Assessing the Success of Mitigation Policies. *Wetlands (Australia)* 19: 1-27.

Ambrose, R.F. and S.F. Lee. 2004. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the Los Angeles Regional Quality Control Board, 1991-2002.

Ambrose, R.F., J.C. Callaway, and S.F. Lee. 2006. An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.

Balzano, S., A. Ertman, L. Brancheau, W. Smejkal, A.S. Greene, M. Kaplan, and D. Fanz. 2002. Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey. NJ Department of Environmental Protection, Division of Science, Research, & Technology. http://www.state.nj.us/dep/dsr/wetlands/final.pdf

Bishel-Machung, L., R.P. Brooks, S.S. Yates, and K.L. Hoover. 1996. Soil Properties of Reference Wetlands and Wetland Creation Projects in Pennsylvania. *Wetlands* 16:532-541.

Breaux, A. and F. Serefiddin. 1999. Validity of Performance Criteria and a Tentative Model for Regulatory Use in Compensatory Wetland Mitigation Permitting. *Environmental Management* 24(3): 327-336.

Brown, S.C. and P.L.M. Veneman. 2001. Effectiveness of Compensatory Wetland Mitigation in Massachusetts, USA. *Wetlands* 21: 508-518.

Brown, S. and P. Veneman. 1998. Compensatory Wetland Mitigation in Massachusetts. Massachussetts Ag Experiment Station, University of Massachusetts.

Brown, P., and C. Lant. 1999. The effect of wetland mitigation banking on the achievement of no-net-loss. *Environmental Management* 23(3): 333-345.

Campbell, D.A., C.A. Cole, and R.P. Brooks. A Comparison of Created and Natural Wetlands in Pennsylvania, USA.

Castelle, A.J., C. Conolly, M. Emers, E.D. Metz, S. Meyer, M. Witter, S. Mauermann, M. Bentley, D. Sheldon, and D. Dole. 1992. Wetland Mitigation Replacement Ratios: Defining Equivalency. Adolfson Associates, Inc. for Shorelands and Coastal Zone Managements Program, Washington Department of Ecology, Olympia, Publication #92-08.

Chase, V. and V. Davis. 1997. Evaluation of Wetland Mitigation in New Hampshire. Audubon Society of New Hampshire.

Cole, C.A. and D. Shaffer 2002. Section 404 Wetland Mitigation and Permit Success Criteria in Pennsylvania, USA, 1986-1999. *Environmental Management* 30(4): 508-515.

Cole, C.A. and R.P. Brooks. 2000. A Comparison of the Hydrological Characteristics of Natural and Created Mainstem Floodplain Wetlands in Pennsylvania. *Ecological Engineering* 14: 221-231.

Cole, C. A., R.P. Brooks, and D.H.Wardrop. 2001. Assessing the Relationship between Biomass and Soil Organic Matter in Created Wetlands of central Pennsylvania, USA. *Ecological Engineering* 7: 423- 428.

DeWeese, J. and C. Gould. 1994. An evaluation of selected wetland creation projects authorized through the Corps of Engineers Section 404 Program. US Department of the Interior, Fish and Wildlife Service, Sacramento Field Office, Sacramento, California, 90 pp.

Eliot, W. 1985. Implementing Mitigation Policies in San Francisco Bay: A Critique. California State Coastal Conservancy. Oakland, CA.

Erwin, K.L. 1991. An Evaluation of Wetland Mitigation in the South Florida. Water Management District, Vol. 1. Methodology. West Palm Beach, FL: South Florida Water Management District.

Fennessy, M.S., J.J. Mack, A. Rokosch, M. Knapp, and M. Micacchion. 2004. Integrated Wetland Assessment Program. Part 5: Biogeochemical and Hydrological Investigations of Natural and Mitigation Wetlands. Ohio EPA Technical Report WET/2004-5. Ohio Environmental Protection Agency, Wetland Ecology Group, Division of Surface Water, Columbus, Ohio.

Fennessy, S., and J. Roehrs. 1997. A Functional Assessment of Mitigation Wetlands in Ohio: Comparisons with Natural Systems. Columbus: Ohio EPA Division of Surface Water.

Fennessy, M.S., M.A. Gray, and R.D. Lopez. 1998. An Ecological Assessment of Wetlands Using Reference Sites Volume 1: Final Report, Volume 2: Appendices. Final Report to U.S. Environmental Protection Agency. Wetlands Unit, Division of Surface Water. Grant CD995761-01.

Fernandez, L. and L. Karp. 1998. Restoring Wetlands through Mitigation Banks. *Environmental and Resource Economics* 12:323-344.

Florida Department of Environmental Regulation. 1991. Report of the Effectiveness of Permitted Mitigation. Florida Department of Environmental Regulation Pursuant to Section 403.918(2)(b), Florida Statutes, Department of Environmental Regulation, State of Florida. March 5, 1991.

Galatowitsch, S.M and A. van der Valk. 1996b. The Vegetation of Restored and Natural Prairie Wetlands. *Ecological Applications* 6:102-112.

Gallihugh, J.L. and J.D. Rogner 1998. Wetland Mitigation and 404 Permit Compliance. Vol. 2. U.S. Fish and Wildlife Service. Chicago, IL. June 1998.

Gilman, E.L. 1998. Nationwide Permit Program: Unknown Adverse Impacts on the Commonwealth of the Northern Mariana Islands' Wetlands. *Coastal Management* 26: 253-277.

Gwin, S.E. and M.E. Kentula. 1990. Evaluating Design and Verifying Compliance of Wetlands Created under Section 404 of the Clean Water Act in Oregon. EPA/600/3-90/061. Corvallis, OR: Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency.

Gwin, S.E., M.E. Kentula, and P.W. Shaffer. 1999. Evaluating the Effects of Wetland Regulation through Hydrogeomorphic Classification and Landscape Profiles. *Wetlands* 19(3): 477-489.

Holland, P.V. and D.C. Bossert. 1994. Mitigation Follow-Up Study of Selected Department of the Army Permits in Southern Louisiana. Lafayette, LA: U.S. Fish and Wildlife Service, Ecological Services.

Holland, C.C., and M.E. Kentula. 1992. Impacts of Section 404 Permits Requiring Compensatory Mitigation on Wetlands in California. *Wetlands Ecology and Management* 2: 157-69.

Johnson, P.A., D.L. Mock, E.J. Teachout, and A. McMillan. 2000. Washington State Wetland Mitigation Evaluation Study. Phase 1: Compliance. Washington State Department of Ecology. June 2000. Publication No. 00-06-016.

Johnson, P., D.L. Mock, A. McMillan, L. Driscoll, and T. Hruby 2002. Washington State Wetland Mitigation Evaluation Study. Phase 2: Evaluating Success. Washington State Department of Ecology. February 2002. Publication No. 02-06-009.

Josselyn, M., S. Chamberlain, K. Goodnight, H. Hopkins, and A. Fiorillo. 1993. Evaluation of Coastal Conservancy Enhancement Projects 1978-1992, Report to the California State Coastal Conservancy, Oakland, CA.

Kelly, N.M. 2001. Changes to the Landscape Patterns of Coastal North Carolina Wetlands under the Clean Water Act. *Landscape Ecology* 16: 3-16.

Kentula, M.E., J.C. Sifneos, J.W. Good, M. Rylko, and K. Kunz. 1992. Trends and Patterns in Section 404 Permitting Requiring Compensatory Mitigation in Oregon and Washington, USA. *Environmental Management* 16: 109-19.

Knapp, M. 2006. Investigations of Invertebrate Communities in Wetlands in the Huron/Erie Lake Plains Ecoregion (2003) and Mitigation Banks (2004). Ohio EPA Technical Report WET/2006-3. An addendum to: Integrated Wetland Assessment Program. Part 8: Initial development of wetland invertebrate community index for Ohio. Ohio Environmental Protection Agency, Ecological Assessment Section, Columbus, Ohio.

Kunz, K., M. Rylko, and E. Somers. 1988. An Assessment of Wetland Mitigation Practices Pursuant to Section 404 Permitting Activities in Washington State. Pages 515-531 in Proceedings First Annual Meeting on Puget Sound Research, Volume 2. Seattle, Washington, March 18-19, 1988. Seattle, WA: Puget Sound Water Quality Authority.

Kusler, J. and M.E. Kentula. 1990. Wetland Creation and Restoration: the Status of the Science. Island Press, Covelo, CA.

Lowe, G., D.Walker, and B.Hatchitt. 1989. Evaluating Manmade Wetlands as Compensation for the Loss of Existing Wetlands in the St. Johns River Water Management District. Pp. 109–118 in Proceedings of 16th Annual Conference on Wetlands Restoration and Creation, F.J. Webb Jr., ed. Plant City, FL: Hillsborough Community College.

Mack, J.J and M. Micacchion. 2006. An Ecological Assessment of Ohio Mitigation Banks: Vegetation, Amphibians, Hydrology, and Soils. Ohio EPA Technical Report WET/2006-1. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio.

Magee, T.K., T.L. Ernst, M.E. Kentula, and K.A. Dwire. 1999. Floristic Comparison of Freshwater Wetlands in an Urbanizing Environment. *Wetlands* 19(3): 517-534.

McEnespy, M. B., and Z. P. Hymanson. 1997. Examination of Past Wetland Projects Permitted by the California Coastal Commission: A report card on project performance. Unpublished Manuscript. Pp. 1-30.

McKinstry, M.C. and S.H. Anderson. 1994. Evaluation of Wetland Creation and Waterfowl Use in Conjunction with Abandoned Mine Lands in Northeast Wyoming. *Wetlands* 14(4): 284-292.

Michigan Department of Environmental Quality. 2001. Michigan Wetland Mitigation and Permit Compliance Study. Lansing, MI: Land and Water Management Division.

Minkin, P. and R. Ladd 2003. Success of Corps-Required Mitigation in New England, USACE New England District.

Mitsch, W.J. and R.F. Wilson. 1996. Improving the Success of Wetland Creation and Restoration with Know-How, Time, and Self-Design. *Ecological Applications* 6: 77-83.

Mockler, Anna, Laura Casey, Mason Bowles, Nick Gillen, and Jon Hansen. 1998. Results of Monitoring King County Wetland and Stream Mitigations. King County Department of Development and Environmental Services.

Morgan, K.L. and T.H. Roberts. 2003. Characterization of Wetland Mitigation Projects in Tennessee, USA. *Wetlands* 23(1): 65-69.

Morgan, K.L. and T.H. Roberts. 1999. An Assessment of Wetland Mitigation in Tennessee. Nashville, TN: Tennessee Department of Environment and Conservation.

National Research Council. 2001. Compensating for Wetland Losses Under the Clean Water Act. National Research Committee on Mitigating Wetland Losses. National Academy Press, Washington DC, USA.

OPPAGA (Office of Program Policy Analysis and Government Accountability) 2000. Policy Review: Wetland Mitigation. Report No. 99–40. Tallahassee, FL: Office of Policy Analysis and Government Accountability.

Porej, D. 2003. An Inventory of Ohio Compensatory Wetland Mitigation. Report to U.S. EPA Grant No. CD97576201-0. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Unit, Columbus, OH.

Porej, D. 2004. Faunal Aspects of Wetland Creation and Restoration. Dissertation. The Ohio State University. 120 pp.

Race, M.S. 1985. Critique of Present Wetlands Mitigation Policies in the United States Based on an Analysis of Past Restoration Projects in San Francisco Bay. *Environmental Management* 9: 71-82.

Race, M.S., and D.R. Christie. 1982. Coastal Zone Development: Mitigation, Marsh Creation and Decision-Making. *Environmental Management* 6(4): 317-328.

Race, M.S. and M.S. Fonseca. 1996. Fixing Compensatory Mitigation: What Will it Take? *Ecological Applications* 6: 94-101.

Redmond, A. 1992. How Successful is Mitigation? *National Wetlands Newsletter* 14(1): 5-6.

Reimold, R.J. and S.A. Cobler. 1986. Wetland Mitigation Effectiveness. United States Environmental Protection Agency. Region I. USEPA contract no. 68-40-0015.

Reiss, K.C., E. Hernandez, M.T. Brown. 2007. An Evaluation of the Effectiveness of Mitigation Banking in Florida: Ecological Success and Compliance with Permit Conditions. Florida Department of Environmental Protection #WM881. EPA Grant #CD 96409404-0. http://www.dep.state.fl.us/water/wetlands/docs/mitigation/Final_Report.pdf.

Robb, J.T. 2002. Assessing Wetland Compensatory Mitigation Sites to Aid in Establishing Mitigation Ratios. *Wetlands* 22(2): 435-440.

Robb, J.T. 2001. Indiana Wetland Compensatory Mitigation: Area Analysis. EPA Grant #CD985482-010-0 Indiana Department of Environmental Management. June 2001.

Shaich, J.A. and K.T. Franklin. 1995. Wetland Compensatory Mitigation in Oregon: A Program Evaluation with a Focus on Portland Metro Area Projects. Oregon Division of State Lands.

Shaffer, P.W. and T.L. Ernst. 1999. Distribution of Soil Organic Matter in Freshwater Emergent/Open Water Wetlands in the Portland, Oregon Metropolitan Area. *Wetlands* 19: 505-516.

Sheldon, D., T. Hruby, P. Johnson, K. Harper, A. McMillan, T. Granger, S. Stanley, and E. Stockdale. 2005. Wetlands in Washington State - Volume 1: A Synthesis of the Science. Washington State Department of Ecology. Publication #05-06-006.

Sibbing, J.M. 1997. Mitigation's Role in Wetland Loss. *National Wetlands Newsletter* 19(1).

Sifneos, J.C., F.W. Cake, Jr., and M.F. Kentula 1992. Effects of Section 404 Permitting on Freshwater Wetlands in Louisiana, Alabama, and Mississippi. *Wetlands* 12: 28-36.

Sifneos, J.C., M.E. Kentula, and P. Price 1992. Impacts of Section 404 Permits Requiring Compensatory Mitigation of Freshwater Wetlands in Texas and Arkansas. *The Texas Journal of Science* 44(4): 475-485.

Smigelski, F. 1996. A Survey of Wetland Mitigation Sites in New England. New England Division, U.S. Army Corps of Engineers. Waltham, MA.

Stolt, M.H., M.H. Genthner, W.L. Daniels, V.A. Groover, S. Nagle, and K.C. Harling. 2000. Comparison of Soil and Other Environmental Conditions in Constructed and Adjacent Palustrine Reference Wetlands. *Wetlands* 20: 671-683.

Storm, L. and J. Stellini. 1994. Interagency Follow-Through Investigation of Compensatory Wetland Mitigation Sites, Joint Agency Staff Report. US Environmental Protection Agency and US Fish and Wildlife Service. 70 pp.

Sudol, M.F., and R.F. Ambrose. 2002. The U.S. Clean Water Act and habitat replacement: evaluation of mitigation sites in Orange County, California, USA. Environmental Management 30: 727-734.

Sudol, Mark F. 1996. Success of Riparian Mitigation as Compensation for Impacts Due to Permits Issued Through Section 404 of the Clean Water Act in Orange County, California. Dissertation for Doctor of Environmental Science and Engineering. University of California, Los Angeles. 215 pp.

Turner, R.E., A.M. Redmond, J.B. Zedler (2001) Count It By Acre of Function—Mitigation Adds Up to Net Loss of Wetlands. *National Wetlands Newsletter* 23(6).

Utah Division of Wildlife Resources. 2001. Assessment of Section 404 Compensatory Mitigation Compliance in Northern Utah. Salt Lake City, UT.

Wilson, Renee F. and William J. Mitsch. 1996. Functional Assessment of Five Wetlands Constructed to Mitigate Wetland Loss in Ohio, USA. *Wetlands* 16(4): 436-451.

Zedler, J. B., and R. Langis. 1991. Comparisons of constructed and natural salt marshes of San Diego Bay. *Restoration and Management Notes* 9: 21-25.

Zedler, J. B., G. D. Williams, and J. S. Desmond. 1997. Wetland Mitigation: Can Fishes Distinguish Between Natural and Constructed Wetlands. *Fisheries* 22: 26-28.

Zedler, J. B., and J. C. Callaway. 1999. Tracking Wetland Restoration: Do Mitigation Sites Follow Desired Trajectories? *Restoration Ecology* 7: 69-73.

Zedler, J.B. 1996. Tidal Wetland Restoration: A Scientific Perspective and Southern California Focus. Report T-038. California Sea Grant College System, University of California, La Jolla, California.

Zentner, J. J. 1988. Wetland Restoration Success in Coastal California. *Increasing Our Wetland Resource: Proceedings of a Conference.* Eds. J.

Zelazny, and J. S. Feierabend, Washington, D.C.: National Wildlife Federation. pp. 216-219.

Zentner, J. J. 1987. Wetland Restoration Success in Coastal California: 1975-1985. Wetland and Riparian Ecosystems of the American West. *Eighth Annual Meeting of the Society of Wetland Scientists,* Technical Coordinators K. M. Mutz, and L. C. Lee, 122-24.

Appendix H
Bibliography of Published Banking Information

Compensatory Mitigation and Habitat Banking Studies and Reviews

Barnett, Harold C. 2000. Mitigation Banking in a Habitat Conservation Plan. (An unpublished paper prepared for the Sonoran Desert Conservation Plan's Implementation Technical Advisory Team.)

Bauer, Marybeth, Jessica Fox, and Michael Bean. 2004. "Landowners Bank on Conservation: The U.S. Fish and Wildlife Service's Guidance on Conservation Banking." Environmental Law Reporter. 34 ELR 10717. Washington, DC: Environmental Law Institute.

Bean, Michael and Lynn Dwyer. 2000. "Mitigation Banking as an Endangered Species Conservation Tool." Environmental Law Reporter. 30 ELR 10537. Washington, DC. Environmental Law Institute.

Carroll, Nathaniel, Ricardo Bayon, and Jessica Fox. "Conservation and Biodiversity Banking: A Guide to Setting Up and Running Biodiversity Credit Trading Systems." In press.

Colburn, James E. 2005. "Trading Spaces: Habitat 'Banking' Under Fish & Wildlife Service Policy." 20 SUM Nat. Resources & Environment 33.

Environmental Law Institute. 1993. *Wetland Mitigation Banking*. Washington, DC. Environmental Law Institute.

Fox, Jessica and Anamaria Nino-Murcia. 2005. "Status of Species Conservation Banking in the United States." Conservation Biology. Vol. 19, No. 4.

Gripne, Stephanie. 2005. "Grassbanks: An Evaluation of a Conservation Tool. An unpublished PhD dissertation.

Hay, Derald. 2006. "When Sealing the Leaks of Habitat Conservation Banking, Multiple Gaskets Are Needed: The Case for Bog Turtle in Pennsylvania." 14 Penn. St. Envtl. L. Rev. 299.

Hearings on Wetlands Mitigation Banking in the Senate Committee on Environment and Public Works (1996) and the House Committee on Transportation and Infrastructure (1997).

Kieser & Associates. 2004. "Ecosystem Multiple Markets: A White Paper." An unpublished draft dated April 2004.

McCollum, Michael. 1997. "Conservation Banks: Regional Planning's Newest Tool." *Linkages*. Institute for Ecological Health. Available at http://www.fscr.org/html/1998-02.html.

Mills, Christopher S. 2004. "Incentives and the ESA: Can Conservation Banking Live Up to Potential?" 14 Duke Environmental Law & Policy Forum 523.

National Research Council. 2001. *Compensating for Wetland Losses Under the Clean Water Act.* Washington, DC: National Academy of Sciences.

Nevel, Bonnie, Joan Milam, Gwen Arnold, and Rachel Harris. April 2004. "Measuring Mitigation: A Review of the Science for Compensatory Mitigation Performance Standards." Washington, DC: Environmental Law Institute. See: http://www.mitigationactionplan.gov/PerformanceStandardsReview.htm.

Rolband, Michael S., Ann Redmond, and Tom Kelsch. 2001. "Wetland Mitigation Banking." Applied Wetlands Science and Technology. (2d ed., Donald M. Kent, ed.). Boca Raton, FL. Lewis Publishers.

Ruhl, J.B. and Salzman, James E. January 2006. "The Effects of Wetland Mitigation Banking on People." FSU College of Law, Public Law Research Paper No. 179.

Ruhl,J.B., Alan Glen, and David Hartman. 2005. "A Practical Guide to Habitat Conservation Banking Law and Policy." Natural Resources & Environment 26-32. Available at: www.law.fsu.edu/faculty/profiles/ruhl/2005-HabitatBanking20NRESummer.pdf.

Salzman, James. 2005. "Creating Markets for Ecosystem Services: Notes from the Field." 80(3) NYU Law Review 870-961.

Stratus Consulting Inc. 2003. "A Nationwide Survey of Conservation Banks." Prepared for the Northwest Fisheries Science Center, NOAA Fisheries, Seattle, WA. Available at: http://www.st.nmfs.gov/st5/abstracts/A_Nationwide_Survey_of_Conservation_Banks.htm.

ten Kate, Kerry, Josh Bishop, and Ricardo Bayon, Biodiversity Offsets: Views, Experience, and the Business Case, IUCN 2004.

Thomas, Roxanne, Austin Kane, Sandra Nichols, Rebecca Gruby, Allison Watkins, Rebecca Kihslinger, and Jason DeRosa. 2008. *State Wetland Program Evaluation: Phase IV.* Washington, DC: Environmental Law Institute.

Thomas, Roxanne, Rebecca Gruby, Rebecca Kihslinger, Allison Watkins, and Austin Kane. 2007. *State Wetland Program Evaluation: Phase III.* Washington, DC: Environmental Law Institute.

Thomas, Roxanne. 2006. *State Wetland Program Evaluation: Phase II.* Washington, DC: Environmental Law Institute.

Thomas, Roxanne. 2005. *State Wetland Program Evaluation: Phase I.* Washington, DC: Environmental Law Institute.

Toyon Consulting. "Conservation Banking: A Technical Report." Prepared for the California Department of Fish and Game. Available at: www.dfg.ca.gov/hcpb/conplan/mitbank/CB%20Tech%20Rept.pdf.

U.S. Fish and Wildlife Service, Sacrament Fish and Wildlife Office. September 2006. *Valley Elderberry Longhorn Beetle – 5-Year Review: Summary and Evaluation*. Available at: http://www.fws.gov/sacramento/es/documents/VELB%205-year%20review.FINAL.pdf.

U.S. Government Accountability Office. September 6, 2006. *Endangered Species: Many Factors Affect the Length of Time to Recover Select Species.* Washington, DC: GAO. GAO-06-730.

U.S. Government Accountability Office. September 2005. *Wetlands Protection: Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring.* Washington, DC: GAO. GAO-05-898.

U.S. Government Accountability Office. May 15, 2002. *U.S. Army Corps of Engineers: Scientific Panel's Assessment of Fish and Wildlife Mitigation Guidance*. Washington, DC: GAO. GAO-02-574.

U.S. Government Accountability Office. February 15, 2001. *Endangered Species Act: Fee-Based Mitigation Arrangements.* Washington, DC: GAO. GAO-01-287R.

Wilcove, David S. and Joon Lee. 2004. "Using Economic and Regulatory Incentives to Restore Endangered Species: Lessons Learned from Three New Programs." Conservation Biology. Vol. 18, No. 3.

Wilkinson, Jessica and Jared Thompson. April 2006. "2005 Status Report on Compensatory Mitigation in the United States." Washington, DC: Environmental Law Institute.

Wilkinson, Jessica, Roxanne Thomas, and Jared Thompson. June 2006. "The Status and Character of In-Lieu Fee Mitigation in the United States." Washington, DC: Environmental Law Institute.

Wilkinson, Jessica, Christina Kennedy, Kelly Mott, Margaret Filbey, Sarah King, and Jim McElfish. 2002. "Banks and Fees: The Status of Off-Site Wetland Mitigation in the United States." Washington, DC: Environmental Law Institute.

Additional and Noteworthy Habitat Banking Resources

California Department of Fish & Game. Various wetland and habitat banking reports at: http://www.dfg.ca.gov/habcon/conplan/mitbank/cmb_pubs.html; http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/catalogue.html.

- "California Wetlands Mitigation Banking - 2005 Report to the Legislature."
- "California Wetlands Mitigation Banking - 2003 Report to the Legislature."
- "California Wetlands Mitigation Banking - 2001 Report to the Legislature."
- "Brief Report on Conservation Banking." 1998.
- "Bucks in the bank .... land bank that is." 1997.
- "Conservation Banks: Regional Planning's Newest Tool." 1997.
- "Conservation Banking - A Technical Report." 1995.

Ecosystem Marketplace, SpeciesBanking.com. Ecosystem Marketplace is developing a separate and publicly available web site on species banking. The central focus of the site will be a registry of all species. The site will be launched in 2008. See: www.SpeciesBanking.com.

Environmental Law Institute, "Banks and Fees" database. The web site includes data on each of the banks identified in the 2002 study, as well as downloadable copies of each of the bank's authorizing instruments. See: http://www2.eli.org/wmb/index.htm.

Forest Trends, Business and Biodiversity Offset Programs. A site that includes a library of articles about banking and related topics at: http://www.forest-trends.org/biodiversityoffsetprogram/library.php.

U.S. Army Corps of Engineers, RIBITS database. The Regional Internet Bank Information Tracking System (RIBITS) is an interactive website designed to track the status of mitigation banks in the U.S. In the near term, RIBITS will also track DOT banks and will likely include U.S. FWS species conservation banks. The database has been "deployed" in the Norfolk and Portland Districts. The Chicago, Jacksonville, Sacramento, and St. Paul Districts will be populated by end of 2007.

- RIBITS National: http://www.erdc.usace.army.mil/pls/erdcpub/!www_fact_sheet.PRODUCT_PAGE?ps_product_numb=114145&tmp_Main_Topic=&page=All
- RIBITS Mobile District: https://samribits.sam.usace.army.mil/ribits/
- RIBITS Norfolk District: https://ribits.nao.usace.army.mil/ribits/index.php

U.S. Fish and Wildlife Service. An up-to-date site from the FWS Sacramento Field Office has an extensive list of banks within the jurisdiction of this field office and links to related information at: http://www.fws.gov/sacramento/es/cons_bank.htm.

Appendix I
Effective Banking Practices

The Permitting Process

- Wetland mitigation banking
  - Fully exhaust avoidance and minimization measures before employing wetland compensatory measures
    - Avoid impacts to wetland habitat to the maximum extent practicable
      - Difficult to replace habitats (i.e, bogs, fens) should be avoided
    - Minimize wetland impacts to habitat to the maximum extent practicable
  - Permit only those impacts for which compensation has a demonstrated track record of replacing lost habitat functions.
- Habitat banking
  - Carefully consider the relative benefits of avoidance and minimization versus compensatory measures when mitigating endangered species impacts

The Bank Approval Process

- Impacts to one type of habitat should generally be offset by credits benefiting the same species or habitat type. In the case of wetland mitigation banking, the exception is when it is environmentally preferable to allow out-of-kind mitigation pursuant to an area-wide management plan to restore a particularly vulnerable or valuable habitat type(s).
- Require banking agreements to be approved by teams comprised of all agencies with regulatory responsibilities for the habitat and/or species of concern.
- Require banks to conform to rules no less detailed than those that apply to wetland mitigation banks under the Clean Water Act or species conservation banks under the Endangered Species Act and these Acts associated federal regulations and guidance.
- Ensure that bank service areas are no larger than is necessary to ensure the replacement of the most localized values that the regulatory program is intended to protect.

Site Selection

- Conduct selection of bank sites at the appropriate scale (i.e., on a watershed scale for wetland banks and ecoregional scale for habitat banks) in order to maintain habitat diversity, connectivity, and appropriate proportions of habitat types needed to enhance the long-term stability of the affected systems.
- Take larger regional plans and conservation strategies into consideration when selecting sites.

Bank Design & Management

- Design banks to be self-sustaining to the maximum extent practicable by following the following guidelines:
  - Consider the hydrogeomorphic and ecological landscape and climate
  - Adopt a dynamic landscape perspective.
  - Restore or develop naturally variable hydrological conditions.
  - Whenever possible, choose habitat restoration over creation.
  - Avoid over-engineered structures in the restored or created habitat's design.
  - Pay particular attention to appropriate planting elevation, depth, soil type, and seasonal timing.
  - Provide appropriately heterogeneous topography.
  - Pay attention to subsurface conditions, including soil and sediment geochemistry and physics, groundwater quantity and quality, and infaunal communities.
  - Consider complications associated with habitat creation or restoration in seriously degraded or disturbed sites.
  - Conduct early monitoring as part of adaptive management.
- Wetland mitigation banking
  - Favor mitigation methods that support no net loss of habitat, such as restoration, over methods that contribute to a net loss, such as preservation.
- Habitat banking
  - Favor mitigation methods that support no net loss of species survival, which may, in some cases include preservation as a first choice.
  - Require management techniques to ensure that preserved habitat continues to support no net loss of species survival.

Legal and Financial Mechanisms

- Ensure that bank programs have effective compliance monitoring and oversight provisions.
- Ensure that bank programs have clear and effective enforcement provisions (i.e., to ensure that liability is transferred from the permittee to the third party banker).
- Tie monitoring periods to meeting project goals and ecological performance standards, rather than an arbitrary time interval.
- Require bank sponsors to secure adequate remedial action funds.
- Require bank sponsors to secure long-term stewardship endowments which transfer to the long-term steward.
- Require bank sponsors to secure an appropriate real estate instrument on bank sites as a prerequisite for bank approval.
- Require that bank sites be protected in perpetuity through an appropriate real estate instrument.
- Require bank sponsors to assign a long-term steward prior to bank approval.

Functional Assessment

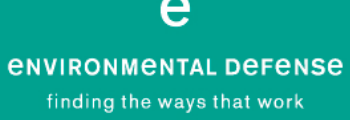
- Plan and measure banks using functional assessment tools that adequately address wildlife considerations.
- Evaluate bank performance in terms of the populations present in reference models for the region and the ecological requirements of those species.
- Evaluate impact sites using the same functional assessment tools as the bank sites (for species banks, it may be practical to assume species impacts rather than to demonstrate them through functional assessment).
- Use functional assessment tools that recognize the larger landscape perspective (i.e., watershed or ecoregion, as appropriate).

Mitigation Goals

- Develop mitigation goals that are clear and specified in terms of measurable ecological performance standards.

Performance Standards

- Tie credit release schedules, relief from legal and financial assurances, and length of monitoring period to banks meeting ecological performance standards.
- Use performance standards that are ecologically based and include wildlife measures.



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