Feasibility of Cooperative Development of Wetland Mitigation Projects

Final Report
February 2006

Sponsored by
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16. Abstract

The Iowa Department of Transportation (Iowa DOT) currently performs wetland mitigation on a project-by-project basis. At the same time, other agencies like the Iowa Department of Natural Resources and Natural Resource Conservation Service are performing wetland restoration projects, and counties and cities may be mitigating wetland losses as well. This project examined the feasibility of developing cooperative wetland mitigation projects in order to utilize state and local resources more efficiently to benefit both Iowa and local communities. The project accomplished the following objectives:

1. Identified and characterized cooperative wetland mitigation programs nationwide.
2. Developed a needs assessment through a survey of state, county, and large city agencies in Iowa to describe wetland mitigation programs and determine challenges with mitigation and program improvements, including long-term risks associated with maintenance and monitoring programs
3. Surveyed state, county, and city agencies and organizations to identify resources available for developing cooperative mitigation projects and procedures.
4. Developed a conceptual framework for cooperative wetland mitigation.

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FEASIBILITY OF COOPERATIVE DEVELOPMENT OF WETLAND MITIGATION PROJECTS

Final Report
February 2006

Principal Investigator
Timothy G. Ellis
Associate Professor
Civil, Construction, and Environmental Engineering, Iowa State University

Co-Principal Investigator
Stephen J. Andrle
Director
Center for Transportation Research and Education, Iowa State University

Authors
Timothy G. Ellis, Stephen J. Andrle, Chris R. Rehmann,
Say K. Ong, and Dan Gieseman

Graduate Student
Jennifer Cheever

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A report from
Center for Transportation Research and Education
Iowa State University
2901 South Loop Drive, Suite 3100
Ames, IA 50010-8634
Phone: 515-294-8103
Fax: 515-294-0467
www.ctre.iastate.edu/

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EXECUTIVE SUMMARY

The findings of this study indicate that most wetland mitigations conducted by the Iowa Department of Transportation (Iowa DOT) in the last five years have constituted small acreages, well under the 25-acre minimum adopted by the Mitigation Banking Review Team for considering wetland banking. The Iowa DOT's Office of Location and Environment has a successful process in place for complying with the National Environmental Policy Act and for obtaining 401 and 404 permits when needed. There do not appear to be project delays now associated with obtaining 404 permits. Accordingly, there is not a strong need for the Iowa DOT to change the current process or to engage in wetland banking.

Wetland banking incurs financial risks, because the DOT would have to spend state highway resources now to build banks and hope to recoup the money with project funds when the bank sells credits in the future. There are enough cases around the country where withdrawal of credits has not been approved after a bank was built that the Iowa DOT should move very cautiously with regard to banking. An opportunistic approach is recommended. If a road project requiring mitigation is in an area where partners can be found, the DOT should be open to banking or other collaborative actions. A clearing house process is recommended to facilitate collaborative action.

A survey of Iowa cities and counties revealed mostly very small mitigation activities (less than 5 Acres) in the last five years. Cities and counties do report administrative difficulties and expenditure of time and money on the 404 permit process. Based on the survey, counties, cities, and County Conservation Boards are willing collaboration partners if the conditions are right. However, only a few counties report mitigation projects that would support banking.

The Iowa Department of Natural Resources procures land annually for wetland restoration under the Prairie Pothole Joint Venture with the U.S. Fish and Wildlife Service. There is potential for collaboration with the DOT, but only in the north central part of the state and under special location circumstances. The National Resource Conservation Service (NRCS) purchases wetlands from landowners under the Wetland Reserve Program (WRP) and temporarily rents land under the Farmable Wetland Program (FWP). There is potential for a clearing house function with the NRCS.

The recommendations of this study are as follow:

1. Since the Iowa DOT has a very good staff and process in place for obtaining 404 and 401 permits, project delay for wetland reasons does not seem to be big problem, and there are few instances of DOT mitigations in the 25 acre range we recommend that the site by site mitigation process continue to be the backbone of the DOT system.
2. The current problems are (1) that to obtain wetland property for mitigation the DOT is purchasing four times the acreage due to the operation of the real estate market; (2) the DOT does not want to manage wetlands or own excess property; and (3) the sustainability of mitigation sites, although good by national standards, could be improved. Therefore, we recommend a *site identification clearing house* involving the NRCS to help identify landowners willing to sell wetlands. The DOT should request that the NRCS contact applicants to the Wetland Reserve Program (WPR) and landowners

exiting the Farmable Wetlands Program (FWP) in affected HUC 8 Districts to aid in obtaining mitigation sites. These landowners could then contact the DOT and negotiation would proceed.

3. To help identify other agencies with mitigation needs or potential site managers, we recommend a *partnership clearinghouse.* While this process currently happens, the DOT should routinely contact cities, counties, the DNR, the Farm Bureau, the County Conservation Commission, and the Natural Heritage Foundations as early as possible in the mitigation process to see if others have mitigation or restoration needs in the area or are willing to consider a management contract.
4. A pre-NEPA planning tool could easily be developed from the Iowa portion of the National Wetland Inventory. (The inventory update is incomplete, but we assume the DNR will gradually complete it.) The centerline of proposed highway projects can be overlaid (using GIS) on the Wetland Inventory Map, stripped of all Cowardin codes not generally associated with mitigation. This tool can return estimated acres impacted. This tool would be crude compared to the field inventory conducted as part of NEPA, but it could produce an early acreage and budget estimate. We recommend that the DOT consider such a planning tool.
5. The level of road construction in the future may increase and make wetland banking more attractive. To prepare for this eventuality and to reduce the financial risk of wetland banking, the Iowa DOT and DNR should consider a joint effort to develop banking service area definitions (watersheds) larger than HUC 8 and adjacent HUC 8 districts, following the Missouri model. Iowa agencies would need to negotiate with the MBRT in advance to determine the terms that would be acceptable. If this were successful, bankers and project builders would have the fiduciary responsibility needed to use the banking process more effectively. The justification would presumably have to be based on the environmental benefits of systematic watershed improvement through building or restoring larger wetland sites. Mitigation could potentially be a watershed improvement tool instead of a detriment.

1. INTRODUCTION

PURPOSE AND OBJECTIVES

The project is sponsored by the Iowa Highway Research Board at the request of the Iowa Department of Transportation, Office of Location and Environment. The purpose of this project is to examine the feasibility of cooperative development of wetland mitigation projects that serve agencies and communities involved with wetland mitigation.

As stated in the Request for Proposals, the Iowa Department of Transportation (Iowa DOT) performs wetland mitigation on a project by project basis. Mitigation sites are usually located within or adjacent to the project area. Site selection is accomplished by contacting state and local resource agencies, local communities, and private landowners.

While the Iowa DOT is mitigating projects on a case by case basis, agencies such as the Iowa Department of Natural Resources and Natural Resource Conservation Service are performing wetland restoration projects, and counties and cities may be mitigating wetland losses as well. The Iowa DOT desires to determine whether state and local resources may be cooperatively utilized for shared wetland mitigation projects that would benefit both Iowa and local communities.

The objectives of this project are to

1. Identify and characterize other cooperative wetland mitigation programs nationwide.
2. Develop a needs assessment through a survey of state, county, and large city agencies to describe wetland mitigation programs and determine challenges with mitigation and program improvements, including long term risks associated with maintenance and monitoring programs
3. Survey state, county, and city agencies and organizations to identify resources to utilize in developing cooperative mitigation projects and procedures.
4. Develop a conceptual framework for cooperative wetland mitigation

LEGISLATIVE AND REGULATORY BACKGROUND

The US Environmental Protection Agency defines wetlands as follows (40 CFR 116.3):

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

Wetlands were historically drained for farmland or developments. A wetland was considered unproductive and a nuisance. Advances in understanding the ecological function of wetlands led to placing a high value on preserving them, culminating in the Clean Water Act (CWA) of 1977.

Two main sections of the Clean Water Act require permits for projects with impacts on wetlands. Section 404 gives the U.S. Army Corps of Engineers jurisdiction to grant permits for construction activities within waterways and wetlands. It requires any construction project that may require the loss of an acre or more of wetlands to notify and apply for a permit from the USACE (ODOT, 1996). The Iowa DOT and any other agency building a project that impacts a wetland must file for a permit

Section 404 of the act regulates the "discharges" of "dredged or fill material" into waters of the U.S. Since wetlands have water, they fall under this section of the act. The section also states that the wetlands program goal is "no net loss of wetlands" (Silverstein, 1994). The CWA does contain some wetland exemptions and it allows some types of projects, such as highway building, to automatically receive general permits (Goldfarb, 1993).

Section 401 of the Clean Water Act gives the Environmental Protection Agency authority to regulate activities that have the potential to adversely affect water quality. Included in this category are projects that impact natural and artificial wetlands. When permitted activities disrupt wetlands, the Clean Water Act requires compensatory mitigation to offset the loss. The determination of compensatory mitigation and division of responsibilities between the USACE and the EPA are found in a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency and the Department of the Army (Memorandum, 1990). Wetlands may also be involved in projects that fall under the regulatory authority of the National Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act.

The 1991 Intermodal Surface Transportation Efficiency Act specifically addressed the use of wetland mitigation banks and authorized the use of federal funds for this type of wetland remediation. In 1993, President Clinton released his wetlands protection plan called "Protecting America's Wetlands: A Fair, Flexible, and Effective Approach" (White House Office on Environmental Policy 1993). This plan attempted to balance the needs of landowners with the need to prevent further wetland losses. This plan endorsed the increased use of mitigation banking. Further direction was given to using wetland mitigation banks with a 1995 Memorandum to the Field. This memorandum was a cooperative effort between the EPA, the USACE, the Natural Resource Conservation Service, the U.S. Fish and Wildlife Services (USFWS), and the National Marine Fisheries Service. Titled "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks", the memo gave more detailed guidance to the use of mitigation banks than had been given before for cases in which other types of compensation "cannot be achieved at the development site or would not be as environmentally beneficial".

Many state, regional, and local levels of government also have rules and regulations on the use or modifications of wetlands. These rules and regulations must be as strict as or stricter than the federal regulations and laws affecting wetlands. This requirement may seem to not impose much of a problem, but in reality it has greatly added to the quagmire. For instance, because no federal law requires bordering states to have the same regulations, wetlands that lie on state boundaries may require developers to conform to two different sets of regulations that may not be compatible.

The 1985 Food Security Act expanded on the Clean Water Act. Part of this act, the Swampbuster provision, says that farmers who convert wetlands cannot receive federal farm aid or benefits for commodities grown on the converted land. Even legally converted wetlands are not an exception to this act (U.S. General Accounting Office, 1991; Salvesen, 1990).

Every five years the U.S. Army Corps of Engineers reissues Nationwide Permits (NWP), which allow certain activities if the adverse effects on the environmental are small enough. For example, NWP 14 allows linear transportations projects, such as highways and railways, to be constructed or modified if the project meets eight criteria. In particular, the discharge must not "cause the loss of greater than 1/2-acre of waters of the US" in non-tidal areas (ACOE, 2002). NWP 14 also requires the District Engineer to be notified if "the discharge causes the loss of greater than 1/10-acre of waters of the US" or if the discharge occurs in a site such as wetlands; in these cases, the permittee must propose mitigation to reduce adverse effects. The Nationwide Permits were last modified in 2002.

The EPA and the U.S. Army Corps of Engineers established the National Wetlands Mitigation Action Plan in 2002. The goal of that plan is to provide no net loss of the Nation's wetlands. The following guiding themes are integral to the mission:

To provide a consistent voice on compensatory mitigation matters
To focus guidance, research and resources to advance ecologically meaningful compensatory mitigation
To provide information and options to those who need to mitigate for losses of wetlands functions
To provide technical and research assistance to those who undertake the work of mitigation

As part of this plan, the EPA and U.S. Army Corps of Engineers provide guidance for compensatory mitigation projects and appropriate use of preservation and vegetative buffers as a component of compensatory mitigation.

Iowa has established a Mitigation Banking Review Team (MBRT) as required under the terms of 1995 Corp of Engineers Memorandum. The MBRT includes members from the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, the US Fish and Wildlife Service, and the EPA. The MBRT prepared "Mitigation Banking in Iowa," a draft document that establishes procedures for creating a mitigation bank in Iowa.

PROJECT OVERSIGHT COMMITTEE

A Project Oversight Committee, which includes the Mitigation Banking Review Team, was established in December 2004 to guide the project. The members are as follow:

Scott Marler, Iowa DOT
Neal Johnson, U.S. Army Corps of Engineers

Heidi Woeber, US Fish and Wildlife Service
Jason Daniels, Environmental Protection Agency
Mark Lindflott, National Resource Conservation Service
Christine Schwake, Iowa Department of Natural Resources
John Goode, Monroe County Engineer
Jeb Brewer, City of Des Moines Engineer
Mike LaPietra, Federal Highway Administration, Iowa Division
Rick Robinson, Iowa Farm Bureau

OVERVIEW OF THE REPORT

Chapter 2 is a literature search of key documents defining wetland mitigation and a description of some of the programs in other states.

Chapter 3 discusses the results of a focus group meeting and survey of Iowa agencies. A focus group meeting was held on March 1, 2005, to discuss issues associated with wetland mitigation and banking in Iowa. Federal, state and local officials were invited, as well as conservation organizations and consulting engineers. Neal Johnson from the U.S. Army Corps of Engineers provided background on Clean Water Act regulations and 404 permitting. Representatives from the Nebraska Department of Roads and Missouri Department of Transportation described wetland mitigation programs in their states.

A survey was conducted in the spring of 2005 of federal, state, city, county, and private entities that may have an interest in cooperative mitigation. The survey revealed a low level of mitigation activity among counties and cities, mostly small parcels in the 1-2 acre range. However, there is great interest in cooperative mitigation. Most agencies that have done mitigation experienced the full range of possible difficulties. The level of frustration and interest is high.

Chapter 4 describes the current mitigation and restoration activities in Iowa and the resources available in Iowa to support a cooperative wetland mitigation program, and assesses the need for cooperative mitigation.

Chapter 5 proposes principles for a cooperative framework and then describes a process that facilitates identifying opportunities for cooperative mitigation.

Attached appendices include survey results, a discussion of technical and scientific issues that affect the success of cooperative wetland mitigation programs, and a sample mitigation banking instrument.

2. LITERATURE SEARCH AND SUMMARY OF WETLAND MITIGATION PROGRAMS IN OTHER STATES

BACKGROUND

Cooperative wetland mitigation is of great interest to road builders, land developers, and policymakers. This literature review covers wetland mitigation basics and cooperative mitigation programs functioning throughout the United States. The different approaches taken by various programs have led to varying results, and Iowa can take away valuable lessons from them.

WETLAND BASICS

What are wetlands?

As stated in the introduction, the US Environmental Protection Agency (EPA) defines wetlands as follows (40 CFR 116.3):

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

The EPA has even termed wetlands as the bridge between land and water. They are transition zones where the flow of water, the cycling of nutrients, and the energy of the sun meet to produce a unique ecosystem characterized by hydrology, soils, and vegetation—making these areas very important features of a watershed (EPA, 2004). The importance of wetlands as a purification step in the water cycle has been well known for years. Aside from simply purifying water, wetlands serve many other ecological purposes. As a method of flood control, wetlands act as large sponges that store water and release it slowly to the surrounding environment. Wetlands also provide a home for nearly 30 percent of plant species and play an integral role in biological productivity (EPA 843-F-01-002c, 2001). Wetlands can be further classified into four general categories:

Marshes: wetlands dominated by soft stemmed vegetation

Swamps: wetlands dominated by woody plants

Bogs: freshwater wetlands, inhabited primarily by spongy peat deposits with a thick, mossy bottom

Fens: freshwater wetlands covered by grasses, sedges, reeds, and wildflowers (EPA, 2004)

The destruction of wetlands has occurred heavily throughout history, primarily to turn land perceived as useless into productive agricultural land. The EPA estimates that 60,000 acres of wetlands are lost each year (EPA 843-F-04-011a, 2004). In Iowa alone, approximately 89 percent of the natural wetlands have been destroyed between 1780 and 1980 (Mitsch and Gosseling, 1993). In the contiguous US, only 53 percent of the wetlands that existed in 1780 remain today. According to the Iowa Department of Natural Resources, Iowa's natural landscape has been altered more than almost any other state in the United States. Only Ohio and California had a higher percentage of wetland loss between the 1780s and the 1980s (Dahl, 1992).

One of Iowa's largest areas of wetlands is the Prairie Pothole Region (Figure 1). This region was created tens of thousands of years ago when the Des Moines Lobe glacier pushed down through the north border of the state to present day Des Moines. The results of this glacier's movement were many depressions that would eventually become some of Iowa's wetlands and lakes. Although nearly 95 percent of these wetlands were converted into agricultural land, the Iowa Natural Heritage Foundation has restored the

function of many of the prairie pothole wetlands over the years by serving as the purchase negotiator, interim owner, and funding source. Additional funding for some of the projects came from Pheasants Forever, Ducks Unlimited, Resource Enhancement and Protection (REAP), and Wildlife Habitat Stamp (IHNF, 2002).

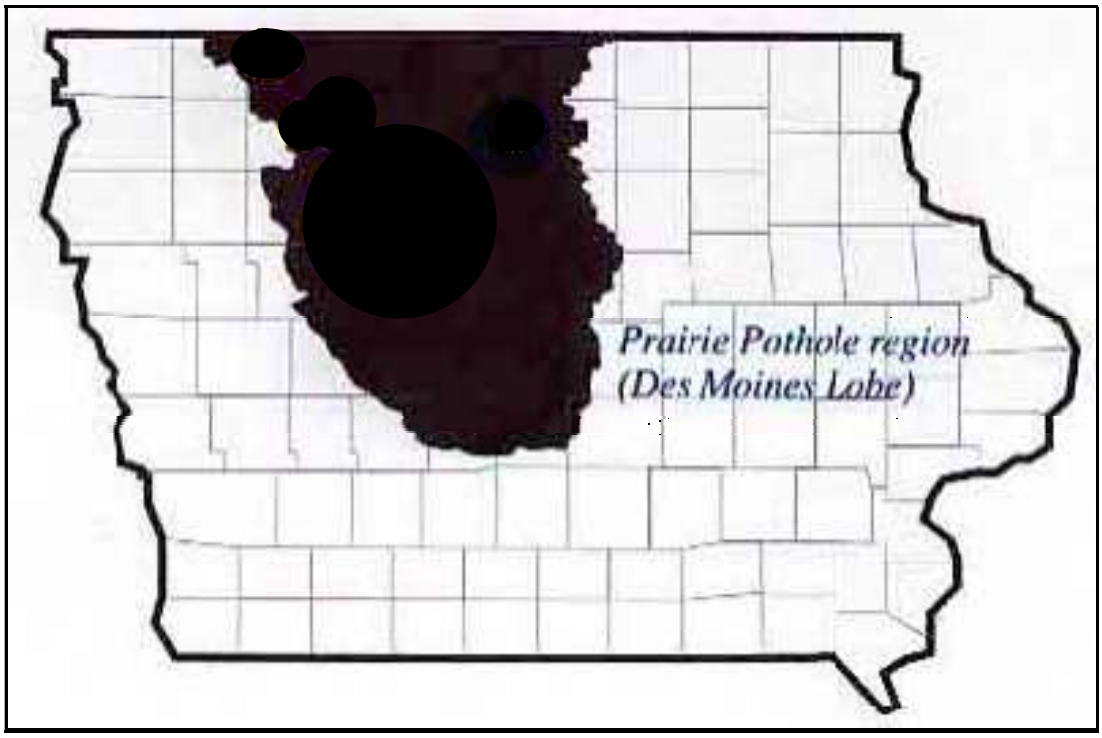

Figure 1. Iowa's Prairie Pothole wetland region (INHF, 2002)

How are wetlands regulated?

Wetlands are regulated primarily through the Clean Water Act. There are two main sections of the Clean Water Act that require permits for projects with impacts on wetlands. Section 404 gives the Army Corps of Engineers authority to regulate construction activities within wetlands and other waters of the United States that involve the discharge of dredged or fill material. Section 401 of the Clean Water Act gives the EPA authority to regulate activities that have the potential to adversely affect water quality. Included in this category are projects that impact natural and artificial wetlands. When permitted activities disrupt wetlands, the Clean Water Act typically requires compensatory mitigation to offset the loss. Wetlands may also be involved in projects that fall under the regulatory authority of the National Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act.

Consequently, the goal of the EPA and the Corps' National Wetlands Mitigation Action Plan (EPA, 2002) is to provide no net loss of the nation's wetlands [Despite the 2001 Supreme Court decision in the case of Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers, which overturned the Corps assertion of federal jurisdiction over certain isolated wetlands, EPA and the Corps still maintain jurisdiction over wetlands not included in the decision]. The following guiding themes are integral to the mission:

To provide a consistent voice on compensatory mitigation matters

To focus guidance, research and resources to advance ecologically meaningful compensatory mitigation

To provide information and options to those who need to mitigate for losses of wetlands functions

To provide technical and research assistance to those who undertake the work of mitigation

As part of this plan, the EPA and Army Corps of Engineers intend to provide guidance for compensatory mitigation projects and appropriate use of preservation and vegetative buffers as a component of compensatory mitigation. Despite these ambitious goals, there have not been many advances in compensatory wetlands mitigation planning, and available resources are not sufficient for local and regional communities as a result of this national effort. Currently, the Iowa DOT undertakes wetlands mitigation projects on a case-by-case basis.

MITIGATION BASICS

What is wetland mitigation?

Wetland mitigation is a regulatory term used to describe the activities that minimize and offset the impact on existing wetlands. Mitigation activities can include avoidance, impact reduction, wetland restoration, creation, preservation, and enhancement. Once all practical measures have been achieved to avoid and minimize, the purpose of mitigation becomes to replace the lost functions of impacted wetlands. This replacement of lost functions is known as "compensatory mitigation."

What are compensatory wetland mitigation options?

The three types of compensatory wetland mitigation approaches most often used are mitigation banking, in-lieu fees, and full delivery mitigation. Mitigation banking was first conceived in the early 1980s in response to the desire for effective and efficient ways to mitigate permitted wetland impacts (Kent, 2001). A request later came from Congress for a comprehensive study of mitigation banking to determine the applicability of such programs to the Clean Water Act Sec. 404 regulations. Consequently, these studies led to the increased development of mitigation banks throughout the country after many state departments of transportation realized the benefits.

What are wetland mitigation banks?

Mitigation banks generally compensate for the loss of wetlands in advance of developmental activities. A particular bank may restore, create, enhance, or preserve a wetland for the purpose of selling credits to interested parties whose intentions are to develop areas currently occupied by wetlands. In the absence of an approved wetland functional assessment, credits are purchased on at least an acre-for-acre basis in assuring that the goal of no net loss in wetland acreage is achieved. These credits are withdrawn from the created bank (as debits) to offset the impact incurred by development. Wetlands mitigation banking was developed to improve upon the piecemeal mitigation of wetlands losses, many of which have gone unmitigated for reasons of practicality (IWR, 1994). The many economic and ecologic advantages to mitigation banking include (Kent, 2001)

Reduced permitting times

The process for receiving a permit for impact may be more streamlined, with fewer entities involved.

Cost effective compensatory mitigation

Individual mitigation on site may be more costly and time consuming than simply purchasing credits in advance from a functioning wetland bank. The goal of no net loss is still achieved, and the sometimes burdensome task of creating a new wetland to mitigate impact is avoided.

Transfer of responsibility to those more qualified

Established banks are operated and monitored by professionals, leaving the responsibility to qualified persons rather than forcing a developer to become an expert on wetland mitigation.

Reduction of temporary loss of function

Functional losses are compensated immediately off site.

Efficient use of regulatory agency resources

Regulatory agencies deal with one entity rather than several individuals, leading to more efficient use of personnel and time.

Disadvantages include

Inconsistent wetland management techniques

Wetland management techniques are not universal and vary from one location to another. This variation creates inconsistencies among bank owners and developers.

No guarantee of "no net loss"

While no net loss may be achieved as far as land use is concerned, a wetland's functions may not be replaced.

Administrative and financial considerations

Long term commitments to banks may be hard to secure both administratively and financially from individual entities (Reppert, 1992).

Wetland mitigation banks are first sponsored by a particular entity that proposes to establish and operate a bank. This sponsor works closely with a mitigation banking review team that helps the sponsor develop a successful bank that can release credits to interested parties. As required by US Army Corps of Engineers, Iowa has an established a Mitigation Banking Review Team (MBRT) composed of state and federal resource agency representatives. The MBRT is responsible for guiding the establishment of wetland mitigation banks and in-lieu fee programs in Iowa. To establish a wetland mitigation bank, a "banking instrument" (contract) is required that specifies how the bank will be established, operated, and monitored. In-lieu fee programs require a Programmatic Agreement describing the process. The agency members of the MBRT are

The U.S. Army Corps of Engineers
The US EPA, Region VII
The US Fish and Wildlife Service
The USDA Natural Resources Conservation Service (NRCS)
The Iowa DNR

After a bank is proven to be successful, the bank is legally protected from future land use and the sponsor assumes responsibility for the long-term management of the bank. Two specific types of mitigation banks are dedicated banks and commercial banks. The primary difference between the two is that dedicated banks compensate for impact by one particular entity, such as a public works department or developer, while commercial banks are those that are accessible to all interested parties making permitted impact to any area (Kent, 2001).

Economically, there are several factors that dictate the demand for mitigation credits from wetland mitigation banks. The primary factors that drive the demand for credits are service area, regulatory climate, and bank user requirements (Kent, 2001). The bank service area refers to the geographical area from which a mitigation bank can draw its customers. Larger service areas typically experience more development, leading to greater permitted impacts and higher mitigation demand. States separate units individually, but typical divisions are in hydrological cataloging units. The regulator climate refers to sentiment created by regulatory agencies in a service area. If it is too difficult to obtain a permit due to strict regulations, the demand for mitigation credits will not be as great. Bank user requirements are the demands by the user to be met by mitigation entities. If more than one bank is present in a service area,

interested parties will seek out the more economical mitigation site, making it more difficult for other sites to remain in the same service area (Kent, 2001). Factors and economic impact are summarized in Table 1.

Table 1. Factors that determine viability of wetland banks (Kent, 2001)

Demand Factor	Economic Impact
Bank service area	Larger service areas experience higher level of demand. Urban settings also experience higher demands.
Regulatory climate	Highly restrictive regulatory impact leads to decreased demand for credits.
Bank user requirements	Having more than one bank in a service area leads to higher demand for higher quality bank.

What are in-lieu fees?

In lieu fees are fees that interested parties pay to entities such as natural resource departments to ensure compensation for permitted impacts to wetlands. Ideally, this fee would cover the full costs of putting the required mitigation strategy into place. This method of mitigation encourages permit recipients to put the responsibility of mitigation in the hands of the qualified, and it can also provide another solution for mitigation when on-site mitigation projects fail. The United States Army Corps of Engineers (USACE) compares this type of mitigation to commercial mitigation banking, in that the sale of credits is allowed for all once impacts have been avoided and minimized. One major difference between in lieu fees (ILF) and mitigation banks is that ILF programs are developed and operated outside federal interagency guidance. This difference has threatened the overall goal of "no net loss" of both wetland acres and wetland functions (Scodari, 2001). Because of this, the CWA Section 404 program has recently included the development of federal guidance to those agencies involved with section 404 permitting. As of September 2000, 17 of the 38 USACE districts had in lieu fee arrangements established, as shown in Figure 2 (GAO-01-325, 2001).

Advantages of in-lieu fee mitigation include the following:

Mitigation can be done in advance.
Permitted impacts are financially accounted for before they occur.
Small permitted impacts can be mitigated more efficiently.
Small mitigation projects can be combined off site to form a large, single mitigation site.
Consolidation of small sites can lead to a greater success rate.
Cost of mitigation is known ahead of time.

Criticisms of in-lieu fee mitigation include the following (Scodari, 2000):

Mitigation may take place outside of watersheds where impact has occurred.
Fees collected from one watershed may be used to implement mitigation in another watershed. (Depending on the approved agreement.)
In-kind mitigation may not be provided.
Compensation provided may not be of the same kind required by impact.

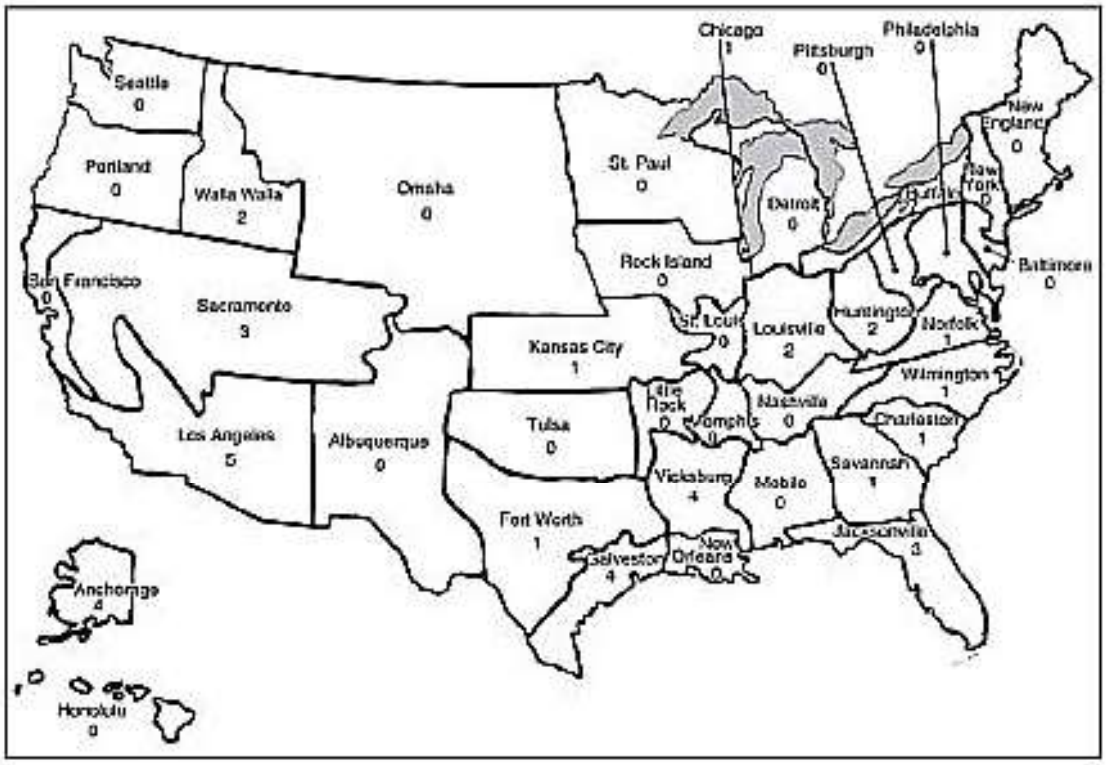

Figure 2. In Lieu Fee Arrangements by Corps District as of September, 2000 (GAO-01-325, 2001)

Revenues collected may be spent on activities that do not necessarily guarantee full compensation for impact.
Funds not spent on establishing new wetlands may result in a net acreage and functional loss.
Lag time between receipt of funds and use of revenues is increased.
Fees from multiple permit recipients must be received before enough revenue is built up to initiate mitigation projects.
Accountability and assurance of success may not be given.
Financial and legal resources may not be available to ensure success of mitigation.

Most of these problems can be resolved in a well-constructed programmatic agreement.

In response to the criticism that mitigation may take place outside of impacted watersheds, the USACE's study of seven different ILF programs found that while some used fees to implement mitigation in different watersheds, the programs have reported full compensation for permitted impacts. Most programs studied required that mitigation be generally done in the same hydrological cataloging unit or watershed. In the USACE's study, the Corps defended the use of in-lieu fee programs only with federal guidance. (Scodari, 2001). In 2001, the United States General Accounting Office's Report GAO-01-325 to Congress regarding the effectiveness of in-lieu fee mitigation was inconclusive regarding the extent to which in-lieu fee mitigation achieves the purpose of effective impact mitigation (GAO-01-325, 2001).

What is full delivery mitigation?

In 2000, the North Carolina Department of Transportation implemented the "Full Delivery" wetland mitigation program in response to a failed in-lieu fee and mitigation banking program (Howard, 2004). The in-lieu fee program was developed in 1996 in attempt to "save the Neuse River from hog farms" (Howard, 2004). The failures of this plan ranged from poor policy to confusion and uncertainty. In response, the NCDOT implemented the full delivery program. This idea proposes that one entity procures, designs, builds, and operates a particular mitigation site (NCDOT, 2003). In a position paper put forth by the National Mitigation Banking Association (NMBA) on state administered full delivery programs, private mitigation banks were determined the most successful mitigation tool to achieve no net loss. The planning process for full delivery programs typically includes the following steps (Schiller, 2001):

Solicit proposals from interested contractors
Review qualifications and prequalify contractors
Identify mitigation needs by location, habitat type, and amount
Issue Request for Proposals to qualified contractors
Review proposals
Conduct site visits with regulatory staff
Evaluate and select appropriate sites based on price and potential for success
Negotiate and enter into contracts with selected firms

Full delivery mitigation has a number of weaknesses and benefits. Benefits of full delivery programs include (NMBA, 2005)

Biological, legal, and financial standards are high.
Having one entity responsible for all three leads to higher standards.
Implementation of projects is steadily tracked.
Some costs can be eliminated because another entity does not have to be hired to track progress.
Private sector and government join to form one program.
The benefits and efficiency of the private sector are combined with a government program to create a useful mitigation site for the use of all interested parties.

Drawbacks of full delivery mitigation are as follows (NMBA, 2005):

Upfront financial obligation is high.
Funding for such projects relies on state funding and requires a large expenditure of public monies. The General Accounting Office reported in 2001 that $47 million in the "planning phase" had accumulated in North Carolina (Howard, 2004).
The goal of no net loss is not guaranteed.
Potential for conflict of interest exists.
Allowing both regulatory and non-profit organizations to collect funds for mitigation can present conflicts of interest for both sectors.
Delays imposed by lengthy studies and bureaucratic policies can occur.

How are mitigation sites selected?

The location of mitigation sites depends heavily on the environmental conditions of the site, including hydrology and soil conditions. Mitigation sites presently selected based on location and availability. However, greater success could possibly be achieved using a selection process called advanced identification, or ADID (Fernandez, 1998). Watershed conservation priorities are set with ADID by identifying wetland functions and appropriate sites for protection and restoration. States currently using this method include Florida, California, and Louisiana (Fernandez, 1998). Maps and functional value assessments of sites are produced, making it easier to choose suitable sites. This method of selection maximizes the benefit from the chosen site and plays an important part in the overall goal of no net

functional loss (Fernandez, 1998). One major downfall of ADID is the unavoidable cost incurred. ADID includes a restoration plan and analysis of sites for restoration potential, which takes time and personnel. Such agencies as the California Coastal Conservancy believe that ADID plays a crucial role in successful restoration projects (Fernandez, 1998).

How are the functions of mitigation sites assessed?

Currently, to determine whether a particular wetland mitigation site has served its purpose, various success criteria (such as a determination as to whether the site meets the criteria in the 1987 Corps of Engineers Wetlands Delineation Manual) are considered. A more conclusive and exact method would be to perform what is called a functional assessment. Typically, this assessment analyzes certain performance parameters and compares them to others to determine whether or not the mitigation site is a success or a failure, although success and failure are vague terms when assessing the actual performance of a mitigation site. Some measurable parameters used for assessment include

Vegetative Diversity
Hydrology
Wildlife Habitat
Water quality measures such as pH, turbidity, and nitrogen content.

Aside from individual evaluation parameters, assessment techniques have been developed by many entities that create a uniform way to assess mitigation. The Hydrogeomorphic Method (HGM) is a technique developed and occasionally used by the U.S. Army Corps of Engineers. This method scales the indices of the functions of mitigated wetlands against regional references to assess the performance (Stein et al., 2000).

While this may seem a simple task, the concept of a universal functional assessment is quite challenging. To date, there have been no universally accepted assessment procedures to determine the values or functions of wetlands (Breaux, 1999). Certain limitations constrain scientists when providing functional assessments for wetlands such as time and experience, which leads to inconsistent assessment from area to area. The need for universal functional assessment is evident, but a set of useful performance criteria for use by all has yet to be created.

COOPERATIVE MITIGATION PROGRAMS

At the time of the printing of the National Cooperative Highway Research Program Report 482 Guidelines for Selecting Compensatory Wetlands Mitigation Options, 42 out of 50 states had active or pending wetland mitigation banks, while 25 states had active banks. Out of the 38 US Army Corps of Engineers districts, 17 have established in lieu fee programs, which have gone unused by state Departments of Transportation for the most part (Marble, 2002). Figure 3 shows the breakdown of states with wetland banks, states with DOT banks, and states without wetland banks. Iowa is the only Midwestern state without a DOT wetland mitigation bank. States that border Iowa with DOT wetland banks are Minnesota, South Dakota, and Nebraska. Discussed below are some of the programs with readily available information on cooperative wetland mitigation programs.

Figure 3. States with active wetland mitigation banks (Marble, 2001)

IOWA

There are two active mitigation banks in Iowa. The Iowa Farm Bureau is sponsoring a wetland mitigation bank for 18 counties in north-central Iowa (Iowa Farm Bureau, 2004). The Iowa Department of Natural Resources (DNR) purchased the site and the Farm Bureau is managing it. The cost is approximately $1,850 per acre mitigated (as of the printing of the informational brochure). The Coultard Mitigation Bank in western Iowa is the second active bank. The Coultard Bank is privately sponsored. The USACE reports that two additional private banks in Iowa are nearing approval.

In 2004, the Iowa DOT commissioned an evaluation of the department's compensatory wetland mitigation program. A sample of 24 sites was reviewed. Fifty-eight percent met or exceeded the Section 404 permit requirements. In some other states noted in the literature, 50–70 percent of sites were not in compliance.

MINNESOTA

Minnesota's first wetland mitigation banking program began with an association comprising the Minnesota Department of Transportation, the Minnesota Department of Natural Resources, and the U.S. Fish and Wildlife Services (Sando, 1998). This effort, at the time, was one of the first in the nation and served as a model for many other wetland mitigation programs. The agreement made by the three agencies was termed "Wetland Habitat Mitigation Banking" (WHMB) and was in place until the Minnesota Wetland Conservation Act established a state wetland mitigation bank. The successes under WHMB were great, as shown by the fact that acres mitigated outnumbered impacted area by a three to one ratio (Sando, 1998).

The rules established by the Minnesota Wetland Conservation Act allow for both public and private

mitigation banking. The public state bank is run by the Minnesota Board of Water and Soil Resources and accepts deposits of restored or created wetlands. The depositor has the option of debiting from these deposits at a later time or selling the deposits as credits to interested parties.

In 1998, the Minnesota Department of Natural Resources conducted a study of wetland mitigation banking. This study confronted several issues pertaining to the state's mitigation banking program and gave a comprehensive background of wetland mitigation banking efforts in the state. As of time of the report submitted, the state wetlands bank had a balance of 934 acres. The following were some of the concerns addressed in the study (Sando, 1998):

Varying quality of sites due to construction practices
Location of sites seldom based on ecological or hydrological need
Insufficient accounting and administration services
Inadequate monitoring efforts
Incomplete replacement plans
Lack of comprehensive, easily accessible data

NEBRASKA

The Nebraska Department of Roads operates several wetland mitigation banking sites throughout the state. In 1997, the Mitigation Banking Review Team in the state came together to form the NDOR's wetland mitigation banking instrument to determine the state's plan for developing a successful network of mitigation banks. The instrument goes into great detail on how sites will be selected, who will be responsible for bank ownership, how credits and debits will be determined, how sites will be monitored, and sets performance standards for determining the success of a particular site. With the help of a dedicated network of local help, Nebraska has developed a useful wetland mitigation banking system. However, Nebraska's banking service areas are based on major land resource area, not HUC 8 units. Changes in the Corps of Engineer's policy may limit service areas to HUC 8s, thereby reducing the viability of the banking program.

FLORIDA

In 1996, state legislators called for a cooperative effort from the Department of Environmental Protection (DEP), Florida's five Water Management Districts, and the Florida Department of Transportation to be put forth for wetland mitigation banking. It was determined that, "environmental mitigation for the impacts of transportation projects proposed of Transportation can be more effectively achieved by regional, long-range mitigation planning rather than on a project-by-project basis." The DOT is now required to determine which road projects in the future will require mitigation efforts. Mitigation banks are not owned and operated by the Department of Transportation, though the DOT is responsible for providing an annual inventory of anticipated wetland impacts (www.dep.state.fl.us).

NORTH CAROLINA

The state of North Carolina uses three mitigation approaches: in house mitigation, in lieu fees, and full delivery programs. Through in house mitigation, the NCDOT Division of Planning and Environment designs and manages projects. While consultants are used to find suitable mitigation sites, DOT personnel are responsible for obtaining right-of-way for projects. The in lieu fee program was established for the state in 1996 and is managed by the NCDNR. Through this option, developers can purchase credits for permitted impact from the NCDNR, who in turn uses the money for wetland creation and restoration. The state has recently implemented the concept of full delivery mitigation through the North Carolina Ecosystem Enhancement Program (NCEEP). Through this program, wetland mitigation occurs under the supervision of one entity, which chooses the site, designs the wetland, builds the project, and is responsible for successful operation. Since 2001, the full delivery program has executed 13 contracts

involving over 1900 acres with 848 developed credits (Schiller, 2001).

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3. FOCUS GROUP MEETING AND IOWA STAKEHOLDER SURVEY

FOCUS GROUP MEETING

A focus group meeting was held on March 1, 2005, to discuss issues associated with mitigation banking in Iowa, laying the groundwork for the needs analysis. Federal, state and local officials were invited, as well as conservation organizations and consulting engineers. Neal Johnson from the US Army Corps of Engineers provided background on Clean Water Act regulations and 404 permitting. Representatives from the Nebraska Department of Roads and Missouri Department of Transportation described wetland mitigation programs in their states. After the plenary presentations, participants separated into breakout groups to discuss risks and obstacles to cooperative mitigation and principles for cooperative mitigation.

Corps of Engineers Role and Responsibility

Mr. Johnson described how the Clean Water Act triggers the Corps' involvement with wetland mitigation projects. Section 404 of the Clean Water Act pertains to any discharged dredge or fill material into wetlands and/or any other waters of the United States. Mr. Johnson mentioned an important case defining the boundaries of protection under the Clean Water Act. A lawsuit from the Solid Waste Agency of Northern Cook County (SWANCC) on the Army Corps of Engineers eliminated the regulation for isolated waters under Section 404. This judgment left all isolated waters unprotected by the Clean Water Act.

Sequential mitigation and compensatory mitigation were discussed. Sequential mitigation is regulated by Section 404(b)(1) guidelines under the Clean Water Act. The goals of sequential mitigation are to avoid and minimize impacts and mitigate for unavoidable impacts by replacing lost wetland functions, not just lost wetlands. Compensatory mitigation applies to both wetlands and streams. In lieu of an approved functional assessment, acre-for-acre mitigation is sought with compensatory mitigation when wetlands are impacted. This compensation can be achieved through restoration—which is the preferred action, creation, enhancement, and preservation. To make compensatory mitigation most effective, Mr. Johnson made it clear that a functional needs assessment is critical. This type of mitigation is not always readily available.

Mr. Johnson outlined important components of both wetland mitigation banking and in-lieu fees. To make wetland mitigation banking successful, banking guidelines, needs assessments, and site selection criteria should be established. In-lieu fees involve applicants paying fees instead of immediate mitigation. These funds may go to natural resource entities (e.g., Department of Natural Resources) which promote the implementation of aquatic resource development programs. In-lieu fees include most of the same conditions as mitigation banking but include an implementation schedule as well.

Mitigation Banking in Nebraska and Missouri

Current wetland efforts in adjoining states were discussed by Gayle Unruh, wetland coordinator for the Missouri Department of Transportation, and Steve Duecker of the Nebraska Department of Roads. Both states' representatives described how each state is divided into service areas and

how each respective program is operated. Missouri's program came up with a set of recommendations for wetland mitigation projects. The recommendations were as follows:

Develop and communicate a unified state position supporting the lead district initiative at the Corps

Promote a sole point of contact, or team of contacts, within the Corps to handle transportation projects

Conduct interagency training workshops

Expand the use of current mitigation options

Establish a wetland mitigation coordination team

Establish policies and implement third-part management

These recommendations helped Missouri's wetland mitigation program become successful.

Mr. Steve Duecker, Environmental Biologist for the Nebraska Department of Roads, described how Nebraska uses its 18 mitigation bank sites and certified wetland banks. Mr. Duecker stressed that a network of local people is crucial to the success of any wetland mitigation program. The Nebraska Department of Roads Wetland Mitigation Banking Instrument outlines criteria for site selection, methods for determining credits and benefits, long-term management and remediation action, and performance standards for determining credit availability and success.

Risks and Obstacles to Cooperative Mitigation

Participants in the breakout groups described a lack of interest in wetland mitigation in Iowa. Participants felt that there was general lack of interest by all parties and that areas being investigated for mitigation were too small. One participant cited studies indicating that nearly half of wetland mitigation banks in use fail to meet the stated goals. One person noted that finding ownership for wetland banks was difficult because neither counties nor the Department of Natural Resources showed interest in owning banks. The Farm Bureau currently has a mitigation bank in north central Iowa that serves over 400 customers. The representative from the Farm Bureau informed the group that nearly 60% of credits have been sold to farmers who are looking to meet governmental regulations; he used this fact as evidence that banking for agricultural customers is viable.

Participants identified several risks and obstacles to cooperative banking. Potential bankers incur risks regarding funding, the market for mitigation banking, changes in governmental regulations, and the viability of mitigated wetlands in perpetuity. Also, a representative from IDOT recommended involving cities and counties—and not just the DOT—in banking. Bankers also incur risk regarding banking ratios, which the Army Corps of Engineers determines. Bankers want high ratios, while developers want low ratios. However, the Corps has no definite algorithm for determining the ratios.

The group discussed obstacles to cooperative mitigation. The three main obstacles that may be faced in cooperative mitigation efforts include regulation, training, and cooperation. Rules change from one organization to another, and these organizations often do not interact well together. For cooperative mitigation to succeed, interagency communication must improve. Functional assessment must be clearer, and assessors must be properly trained to evaluate the

effectiveness of a mitigation project. A framework for communication is needed to improve cooperation. While many other obstacles exist, participants thought that overcoming these main barriers would make cooperative mitigation easier.

Principles for Cooperative Mitigation

Participants in the focus group identified principles that should be incorporated in a wetland mitigation banking program; they suggested

- Developing a wetlands clearinghouse to match needs with availability
- Organizing a group to oversee this clearinghouse and manage its funds
- Coordinating science, policy, and the needs of clients
- Educating the public and keeping communication clear
- Separating public and private banking
- Keeping the process simple
- Involving neighborhoods
- Ensuring adequate funding
- Hosting an American Society of Civil Engineers conference on water resources
- Eliminating or minimizing changes in governmental regulations
- Determining boundaries of service areas

The group also identified the research needed to support cooperative mitigation. The top priority is research regarding functional assessment. Economic research to assess the feasibility of wetland banking would also be useful. Different techniques for wetland mitigation could also be compared to assess the effectiveness of each method.

SURVEY OF IOWA STAKEHOLDERS

To gain a better understanding of the climate of cooperative wetland mitigation in Iowa and to expand on the findings of the focus group, a survey was sent to over 300 interested parties in Iowa. Participating groups ranged from city engineering departments to county conservation boards. The survey was sponsored by the Iowa Department of Transportation, the Iowa Highway Research Board, and the Federal Highway Administration. Respondents were assured that individual responses would be kept confidential and that participation was voluntary.

From the survey, the general sentiment of several entities for cooperative wetland mitigation was assessed. People were asked about topics ranging from interest in mitigation to specific experience and issues regarding mitigation, including mitigation costs, difficulties, partnerships, locations, and financing. Additional comments that respondents wrote on surveys can be found in Appendix A. We emphasize that the results reported in this section represent only the experience of the respondents; they do not constitute an exhaustive inventory of wetlands mitigation in Iowa. In chapter 4, we discuss these results in terms of data from the U.S. Army Corps of Engineers Rock Island District and the Iowa DOT.

Of the 300 plus surveys sent, 102 surveys were returned. The original deadline was extended to increase the number of responses.

Survey Response

Respondents were grouped by entity: city, county, state, county conservation boards, federal, private organization, and other. Over half of the respondents were from county engineering departments, and county conservation boards were second in representation, with nearly 30% of responses (Figure 4). Private and state organizations went unrepresented.

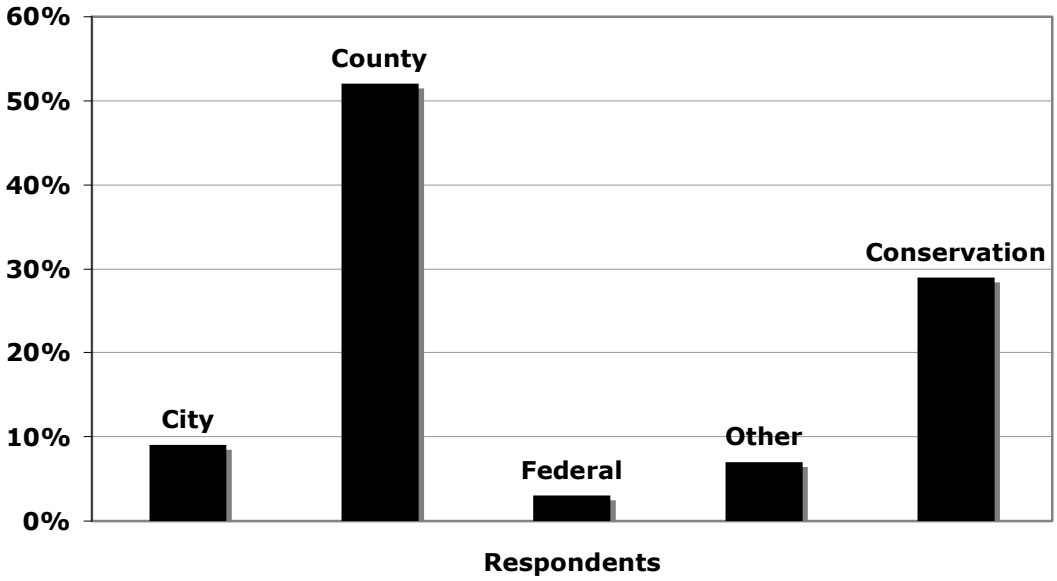

Figure 4. Survey respondents by group

Needs and Interest

Each entity assessed its likely need for mitigation. The need for mitigation could occur at any time since a time period was not specified. Response options were no need, minimal need (fewer than 1-2 projects per year), moderate need (1-2 projects per year), and great need (more than 2 projects per year). The likely need for mitigation was not great by many entities and minimal for most respondents (Figure 5). Just as most respondents did not see a likely need for mitigation, most also did not see a need for mitigation legislation (Figure 6). Although the need for mitigation was not evident, the interest in wetland mitigation was: Overall, 83 of the 102 respondents had some interest in wetland mitigation (Figure 7).

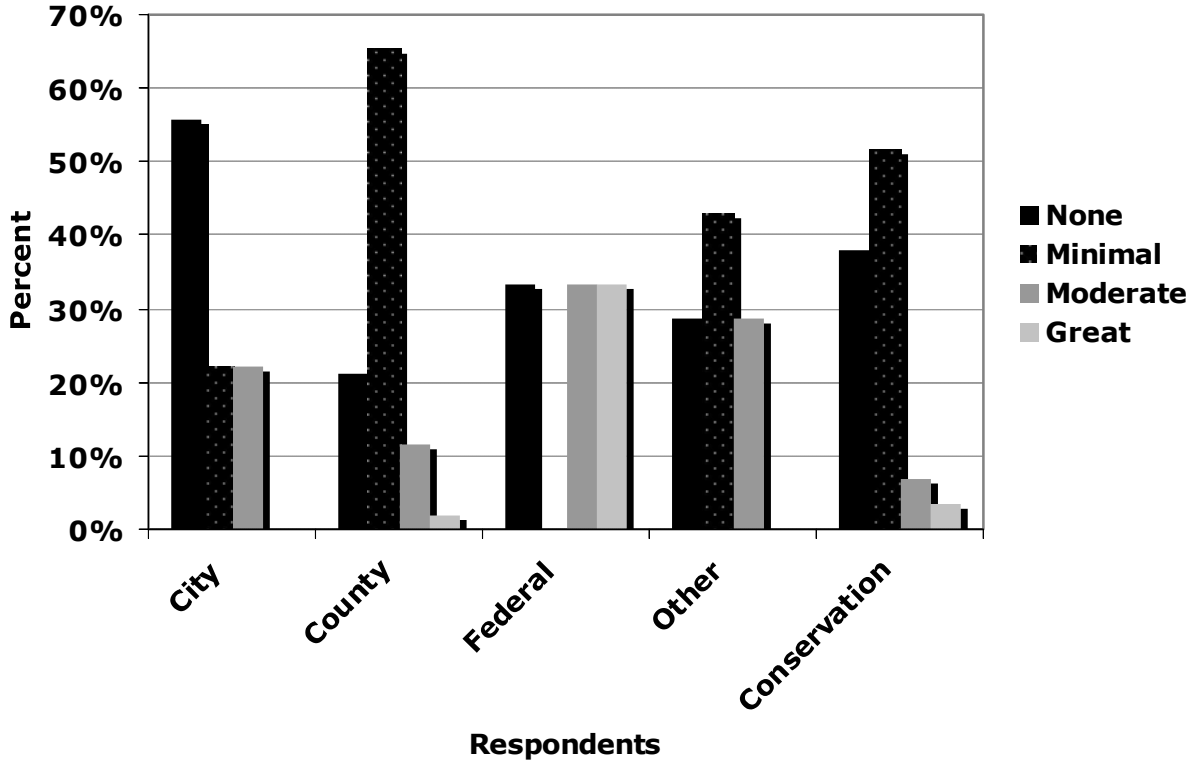

Figure 5. Likely need for wetland mitigation for each category of respondent

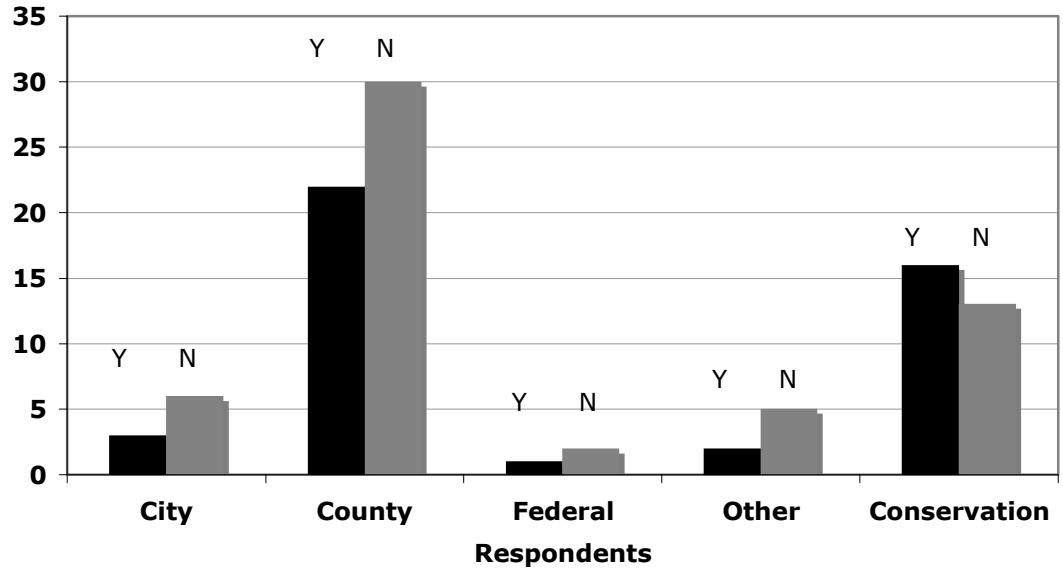

Figure 6. Need for mitigation legislation for each category

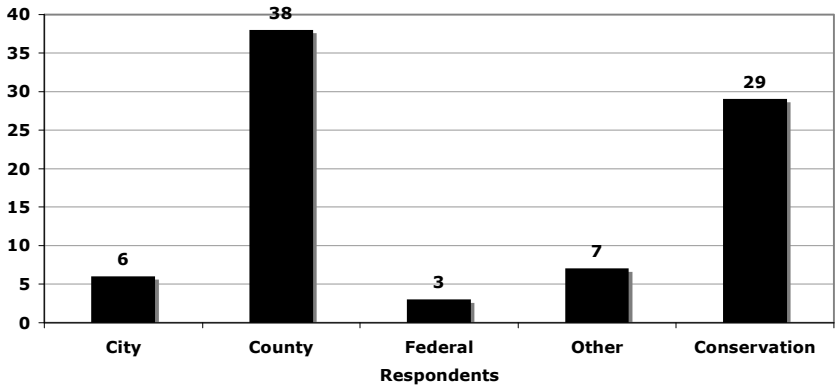

Figure 7. Interest in wetland mitigation in each category

Mitigation Activity

Of the 102 respondents, 27 have participated in wetland mitigation projects in the last five years including wetland restoration, creation, and enhancement. Of those, 20 were county engineers, and the remaining 7 were county conservation boards. The projects encompass a total mitigated area of 164 acres, or an average of 33 acres/year. While fewer of the respondents who participated in wetlands mitigation were from conservation boards, their projects made up 65% of the total mitigated area. Even among the 27 respondents who reported some mitigation, most had less than 5 acres in the past five years (Figure 8); only one respondent, a county conservation board with 51 acres, reported more than 20 acres since 2000. Most mitigation projects involve creating wetlands (Figure 9). Locations of wetlands projects are listed in Table 2.

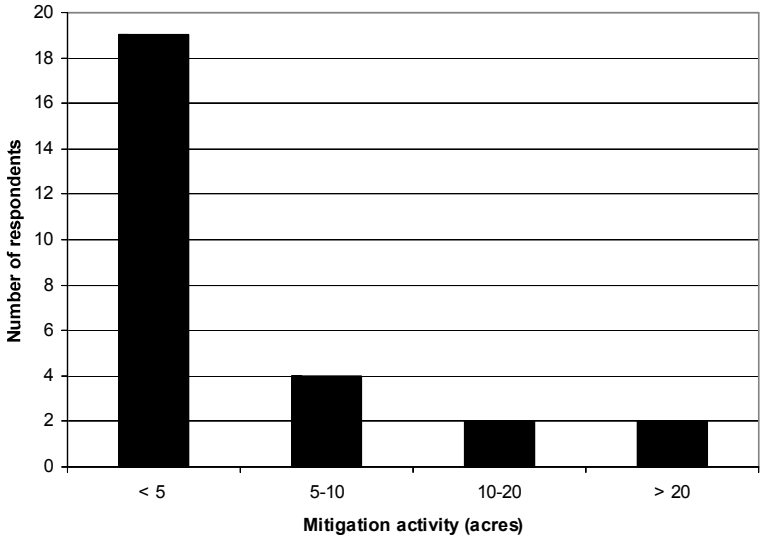

Figure 8. Mitigation activity, expressed in area of mitigated wetlands, in the last five years

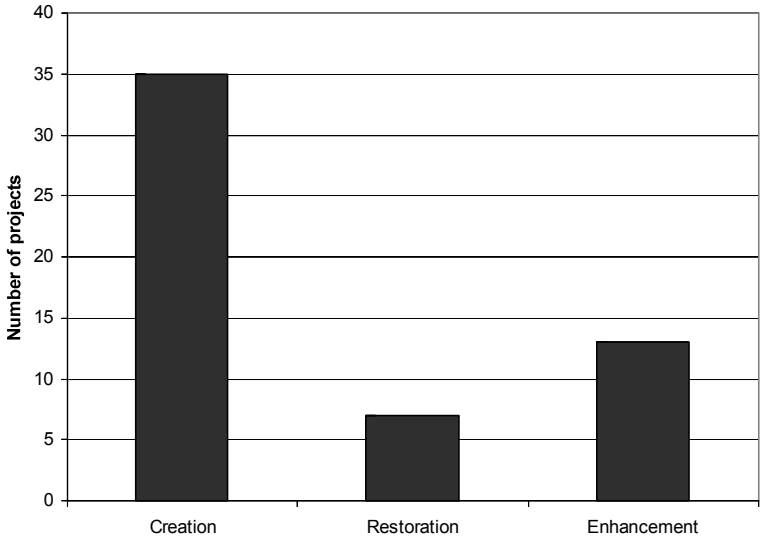

Figure 9. Mitigation actions performed

Table 2. Mitigation actions and acreage by location (Because the survey was anonymous, some respondents did not report the location of their projects.)

Location	Number of mitigation projects		
	Creation	Restoration	Enhancement
Ankeny	2	2	2
Black Hawk County	1	0	1
Boone County	2	0	0
Bremer County	1	0	0
Buchanan County	1	0	1
Chickasaw County	1	0	0
Dallas County	1	0	1
Delaware County	1	0	1
Dickinson County	1	0	0
Fayette County	2	0	0
Johnson County	4	0	0
Jones County	1	0	0
Keokuk County	2	0	0
Kossuth County	0	1	0
Lee County	2	0	0
Mitchell County	0	1	0
Monroe County	3	0	1
Pocahontas County	2	0	0
Polk County	2	0	1
Scott County	0	1	0
Washington County	4	0	0
Winnesheik County	1	0	0
Wright County	1	0	0
Unreported location	0	2	5
Total	35	7	13

Difficulties

Respondents have encountered many difficulties in wetland mitigation (Figure 10). More respondents experienced difficulty with mitigation even though they did not complete mitigation projects: Although the respondents were asked to stop with the survey if they did not participate in wetlands mitigation, many responded to the question about the difficulties anyway. While the difficulty most often encountered was location, more than 25% of the respondents experienced problems with assessment, administrative time, project delays, stringent requirements, and monitoring and reporting.

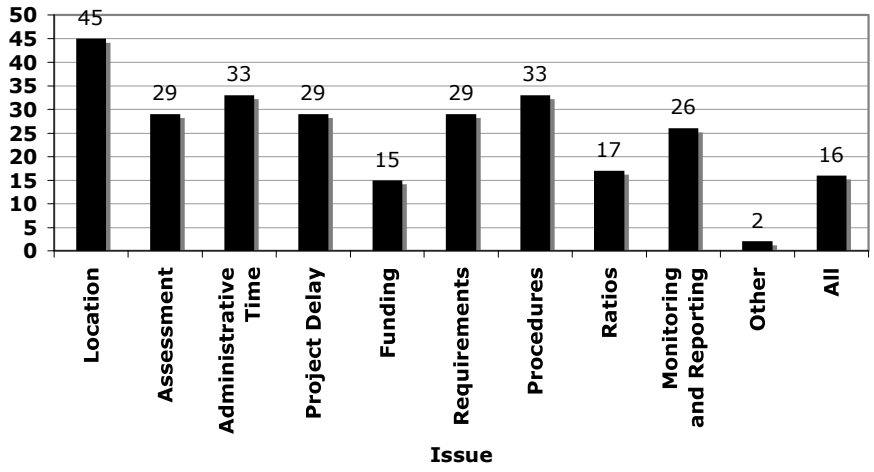

Figure 10. Wetland mitigation difficulties experienced

Partnerships

When participating in wetland mitigation, some organizations formed partnerships for various reasons. Counties and conservation boards formed partnerships with local entities most often, though state, federal, and private entities are also represented (Table 3). These partnerships helped with land donation, construction, design, financing, monitoring (Figure 11).

Table 3. Mitigation partnerships by respondent category

	Partner category				
Respondent category	None	Local	State	Federal	Private
City	1	0	0	0	1
County	5	8	2	1	4
Federal	1	0	0	0	0
Conservation	0	8	6	3	4

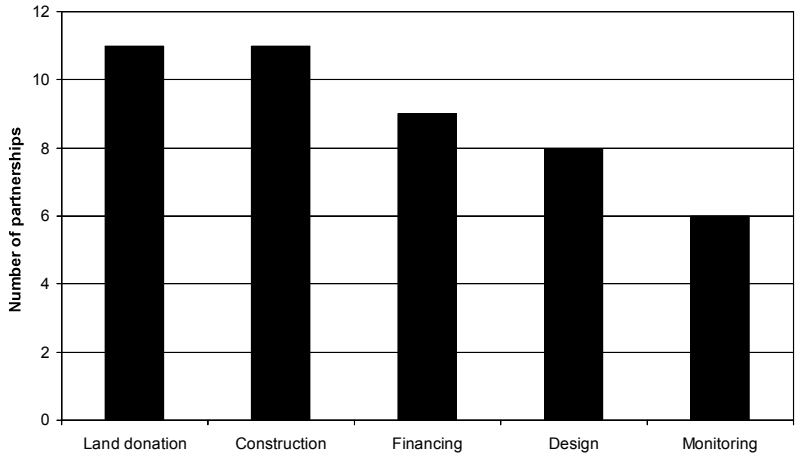

Figure 11. Forms of partnerships

Finance

Financing for mitigation projects came from various sources. The most common funding source for mitigation projects, especially those of counties, was the project funds (Table 4). No project was funded through donations or endowments. Some of the respondents reported the cost of mitigation. The mean and median costs for all projects were $17,000 and $3200 per acre, respectively. Small parcels cost more per acre than large projects (Figure 12). The differences between the mean and median values show that the costs vary considerably between projects.

Table 4. Sources of finances for mitigation projects

	Source of finances				
Respondent type	Project funds	Donation	Endowment	State funds	Other
City	3	0	0	0	0
County	21	0	0	2	6
Federal	1	0	0	0	0
Conservation	2	0	0	3	5

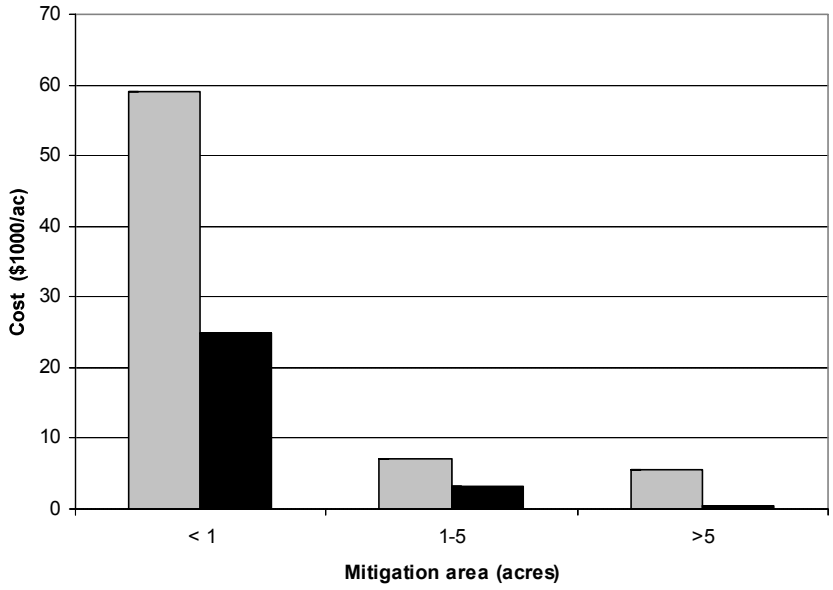

Figure 12. Cost of wetland mitigation for projects of different sizes
(Need legend: Gray bars are the mean cost per acre, and black bars are the median cost per acre.)

SUMMARY

The county engineer and county conservation board respondents clearly show interest in cooperative wetland mitigation, though the likely need for mitigation is minimal (1–2 projects per year per respondent). Only six respondents from cities expressed interest in cooperative strategies. Among the respondents, mitigation activity is relatively low: Only one respondent reported more that 50 acres in the last five years, and most reported less than 5 acres. Respondents that did participate in mitigation activities (and even some that did not) reported a full range of difficulties. Counties and conservation boards worked with local, state, federal, and private entities to get help with many aspects of mitigation. Projects were financed mainly with project funds. Costs of mitigation projects vary considerably, and small projects are more expensive (per acre) than large projects.

4. NEED FOR COOPERATIVE WETLAND MITIGATION

This chapter inventories resources for cooperative mitigation in Iowa, describes the Iowa DOT process for assessing wetland mitigation needs and the volume of mitigation activity, and describes programs in Iowa that acquire wetlands for restoration or habitat development. When these activities occur in the same geographic are, there is an opportunity to restoration activities cooperatively with mitigation. One can claim there is a need for cooperative mitigation when failure to be aware of or take advantage of an opportunity creates an unnecessary cost or introduces a project delay. This chapter builds a case that there are opportunities and that a structure can be created to take advantage of them.

RESOURCES FOR COOPERATIVE MITIGATION

The State of Iowa has most of the resources necessary to engage in a cooperative wetland mitigation program. Key agencies, organizations, and resources already in place in Iowa include:

- Department of Natural Resources
  - Prairie Pothole Joint Venture (PPJV) with U.S. Fish and Wildlife Service Waterfowl Production Area (WPA) program.
- Natural Resource Conservation Service
  - Wetland Reserve Program (WRP) And Farmable Wetland Program (FWP)
- County conservation boards
- State universities
- Natural Heritage Foundation and various other non-profit organizations that could potentially broker cooperative activities.
- US Fish and Wildlife Service
  - Waterfowl Production Area Program
- Farm Bureau – operates one bank in central Iowa
- Mitigation Banking Review Team
- Private banking- one in Iowa now

Key data resources include:

- Partial update of National Wetlands Inventory (20 counties)
- Digital soils information
- Five year Iowa DOT planned construction program
- Infrared aerial photography
- Iowa State University's GIS capabilities
- County and/or city GIS capabilities
- NRCS list of candidates applying to WRP and FWP programs
- Statewide engineering consultants

This chapter describes the wetland mitigation program of the Iowa DOT and the restoration programs of the Department of Natural Resources, National Resource Conservation Service, and county conservation boards.

Mitigation Banking Review Team

Iowa has established a Mitigation Banking Review Team (MBRT) composed of representatives of these agencies:

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
Iowa Department of Natural Resources
National Resource Conservation Service
U.S. Fish and Wildlife Service

The MBRT has developed a draft document directing the establishment of mitigation banks in Iowa, entitled "Mitigation Banking in Iowa." This document defines the goals, site selection criteria, prospectus requirements, ownership, and operating requirement for mitigation banks in Iowa. If a bank is proposed a prospectus must first be submitted to the MBRT and a Banking Instrument or contract must be developed that establishes the operational procedures for the bank.

The service area of a bank is a major issue. A prospectus must include a proposed service area, but to sell credits from a bank for a specific project, the sequential process required by the Corps of Engineers must be followed—avoid, minimize impact, mitigate. The MBRT has adopted the policy that a mitigation site must be in the same Major Land Resource Area (MLRA) and the same or an adjacent HUC 8 district.

Figure 13 shows a topographical map of Iowa overlaid with the HUC 8 districts, MLRA boundaries, and county lines. This clearly shows the relationships of the boundaries to watersheds. Each area created by the intersection of a HUC 8 boundary and an MLRA boundary defines a "cell" that could become part of a banking service area. This is a fairly restrictive service area policy, but is comfortable for the MBRT agencies.

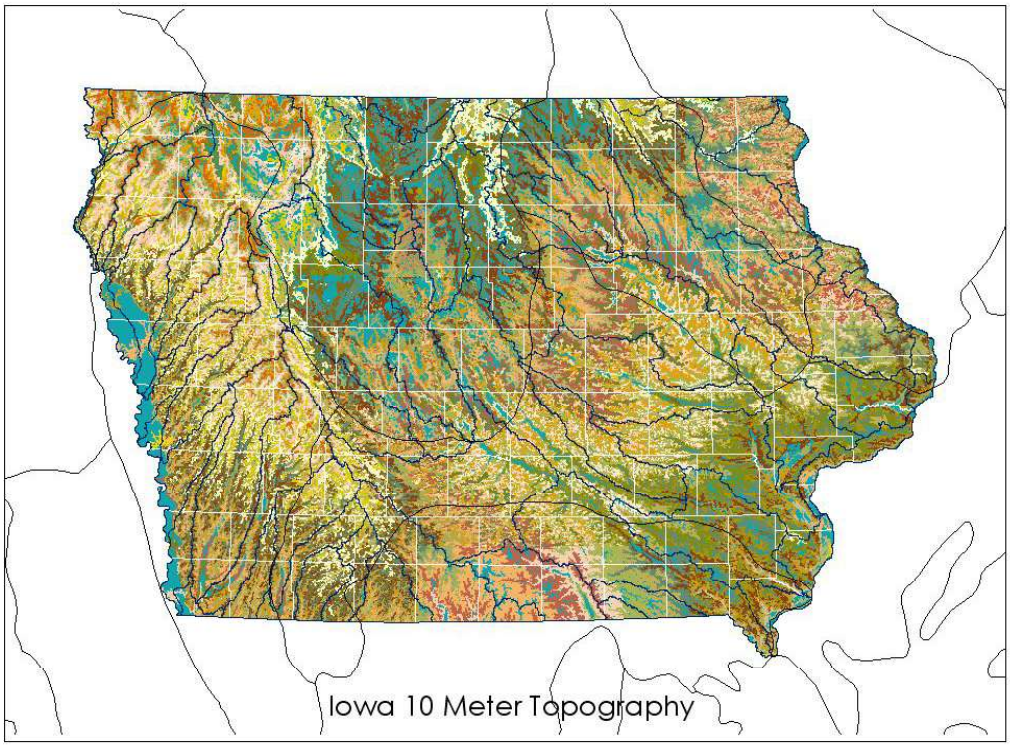

Figure 13. HUC 8 districts in Iowa

Present Iowa DOT Process for On-Site Mitigation

The Iowa DOT mitigates most wetland impacts on a site by site basis. The Department of Location and Environment is responsible for securing 401 and 404 permits for all construction that will involve dredging or filling of water resources covered by the Clean Water Act.

The Iowa Transportation Commission approves a five-year construction plan each year, which is the basis for design and eventual construction. Wetland mitigation is part of the Iowa DOT's "Can Do' process, a step-by-step listing of all activities involved in building a road. The first wetland review is part of the NEPA process which is initiated 4-5 years prior to planned construction. Since this is very early in the process, detailed location and design information are not available. The National Wetlands Inventory, soils inventory, and infrared aerial photography are used at this stage in combination with a proposed right-of–way to avoid wetland impacts to the extent possible and identify unavoidable wetland impacts.

The next review occurs about two years prior to planned construction. The DOT's goal is to secure permits at least six months before construction begins. To achieve this goal, staff must be in the field at least two summers prior to construction. Work must be done in the summer because wetland delineation includes vegetation criteria. At this point, staff has the design ROW location and width. Equipped with GPS receivers and the latitude and longitude boundaries of the ROW, the staff walks the ROW and identifies the boundaries of wetlands that fall within it and categorizes the types of wetlands present based on vegetation, soils, and hydrology. The

Corps of Engineers Wetland Delineation Manual (1987) is used for unfarmed lands and the NRCS Food Security Act method is used for farmed lands. The total impacted wetland acreage is identified and classified.

The staff then seeks a mitigation site that is on or adjacent to the impacted site that exhibits wetland characteristics similar to the impacted site. The Iowa DOT mitigates at a 1.5 to 1 acreage ratio. The Office of Location and Environment staff prepares the 404 and 401 permit applications. If approval is received from the Army Corps of Engineers (404) and the Iowa DNR (401), the mitigation site is purchased with project funds and creation or restoration activities are commenced.

Data provided by Iowa DOT covering 1990 to 2004 show that the DOT mitigated 1,500 acres of wetlands at 128 sites during this period (see Figure 14). This is about 100 acres per year. Iowa DOT also mitigated about 100 acres of woodland, protected under section 314.23, Code of Iowa. This mitigation activity required purchase of 6,200 acres, because the DOT must purchase land on the market from willing sellers. The purchase opportunities do not precisely match the mitigation requirements.

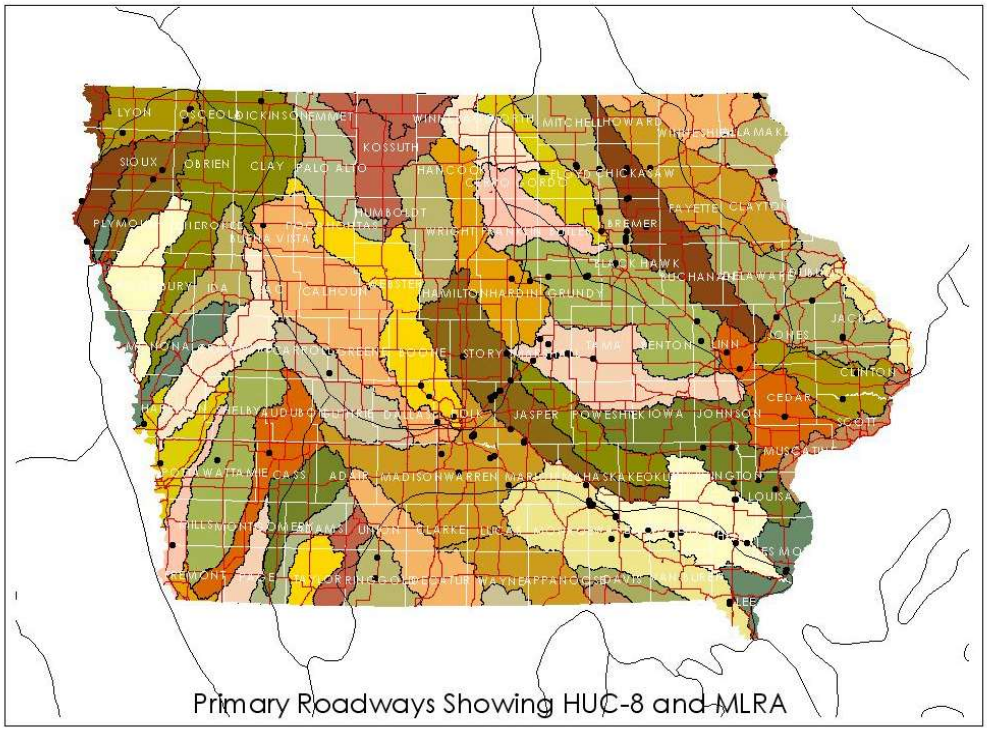

Figure 14. Iowa DOT mitigation sites on a base with county lines, primary roads, HUC 8 districts, and MLRA

Iowa Department of Natural Resources Prairie Pothole Joint Venture (PPJV) and Waterfowl Production Areas (WPA)

The Iowa DNR owns 400,000 acres woodland, grassland, and wetland marsh purchased for wildlife habitat. The DNR acquires on the order of 3,000 acres per year under the Prairie Pothole Joint Venture program and the Waterfowl Production Area program. The PPJV is joint with the US Fish and Wildlife Service. Most of the land is managed by the Iowa DNR, but the DNR sometimes enters into 28-E interlocal agreements with county conservation boards to manage sites. Funding for land acquisition comes from the Iowa Resource Enhancement Program (REAP), the US Fish and Wildlife Service Waterfowl Protection Act, and an allocation from Iowa state hunting and fishing licenses.

Much of the purchased land is woodland or upland, but approximately 400 to 500 acres per year is wetland. The DNR has identified 101 priority areas in north Central Iowa and purchases land in those areas. The budget does not permit active acquisition in all priority areas on a regular basis, so land is acquired to enhance existing sites. The goal is to develop sites of 1,000 acres or more. If an opportunity arises, the DNR can adapt to take advantage or that opportunity.

The Iowa DOT Location and Environment staff contacts the DNR periodically when seeking wetland mitigation sites to see if there is an opportunity for joint action. In the past the DOT mitigation sites have not been close enough to DNR priority areas or existing DNR-owned land to engage in cooperative action.

The benefit of joint mitigation is that the DOT could contribute to a large, managed site, increasing the probability for a successful DOT mitigation. The Corps of Engineers' regulations require that new wetland be purchased and restored for mitigation. An existing wetland cannot be claimed for mitigation unless a bank is formally created in advance. There may be potential from time to time for an in lieu fee mitigation or for the DOT to add land to an existing DNR site. In either case a more sustainable wetland mitigation is achieved and the DNR is equipped to manage the site in perpetuity.

US Natural Resource Conservation Service (NRCS) Wetland Reserve Program and Farmable Wetland Program (FWP)

The NRCS operates the Wetland Reserve Program (WRP), in which the NRCS purchases wetland easements from private land owners. The goals of the program include providing habitat for migratory birds, wetland dependent wildlife, endangered species, and improving water quality. In Iowa, approximately 140,000 acres are in the WRP and FWP programs. The waiting list to enroll in the WRP program is much greater than the annual budget, roughly a $60-$70 million backlog. There is a potential opportunity for the Iowa DOT to use this waiting list to help identify mitigation sites. Privacy requirements prevent making the waiting list public, but there may be potential for a properly-structured clearing house solution.

Under the Wetland Preserve Program, the NRCS purchases the agricultural value of the land when creating an easement and pays to restore the wetland. The land owner receives a payment for participating. The land owner still controls access to the land and has to pay taxes in most counties. In some cases the Iowa DNR subsequently purchases the residual value of the easement

and converts the easement to public land. About 42% of the land in the easement program is now in public ownership.

Farmers can take wetland out of production under the Farmable Wetland Program (FWP) for 10-15 year periods and receive payment through the CRP program. 4,000 to 7,000 acres per year are enrolled in the farmable wetland program. These lands are not eligible for wetland mitigation because they are not committed to wetlands in perpetuity. However, as the lease periods end land owners may be interested in other mechanisms for earning income off unproductive land. FWP sites for which the lease period is expiring are another potential resource for restoration or mitigation.

National Wetland Inventory

The Iowa DNR has completed digital mapping of 20 counties as part of the National Wetlands Inventory. Color-infra-red aerial photography was used to obtain the digital images which are mapped in GIS format. Data for the other 79 counties date from the 1980s.

Wetlands are classified according to the Cowardin system. There are five basic wetland **systems**: Marine, Estuarine, Lacustrine, Palustrine, and Riverine. Marine and Estuarine systems are not found in Iowa. The lacustrine and riverine are further divided into **subsystems** as shown:

Lacustrine -- lakes
1. Limnetic – deep open water
2. Littoral—near shore

Palustrine – swamps or marshes
No subsystems

Riverine -- rivers
1. Tidal
2. Lower Perennial
3. Upper Perennial
4. Intermittent
5. Unknown Perennial

The subsystems are further subdivided into **classes** such as rocky bottom (RB), unconsolidated bottom (UB), aquatic bed (AB), etc. The classes are identified by initials as shown in parenthesis. The complete description can be found in Cowardin, L.M., *Classification of Wetlands and Deepwater Habitats in the United States*, 1979. The document may be found on the web at the US Geological Service site:
http://www.npwrc.usgs.gov/resource/1998/classwet/classwet.htm

In addition to class and subclass, additional **modifiers** provide for distinguishing finer differences in life forms present. Fourteen **water regimes** may be specified, such as temporarily flooded, seasonally flooded, saturated, etc. **Chemistry** modifiers may be added such as pH or salinity. **Soil** may be specified as mineral or organic. Seven **special modifiers** may also be added such as excavated, diked/impounded, farmed, beaver created, etc.

According to the Iowa Department of Transportation, the categories of wetlands usually

associated with compensatory mitigation requirements under section 404 and 401 of the Clean Water Act are these:

PEM --Palustrine Emergent (edge of swamps or marshes)
PFO—Palustrine Forested (wooded area around swamps or marshes)
PSS -- Palustrine Scrub Shrub (scrub tree area near swamps or marshes)
PUB—Palustrine Unconsolidated Bottom (ponds and prairie pot holes)
R2— Riverine Lower Perennial

Figure 15 below from Cowardin illustrates Palustrian habitats.

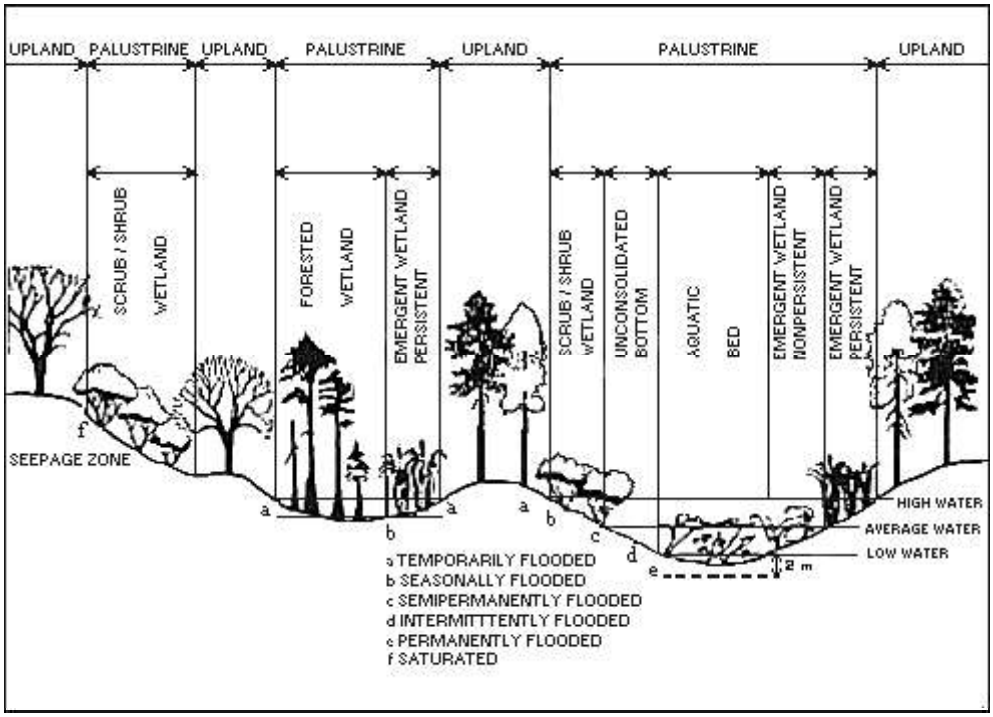

Figure 15. Distinguishing features and examples of habitats in the Palustrine System

Guidance for classifying wetlands according to this system may be found in *Cowardin* and in Corps of Engineers Wetland Delineation manual, 1987.

There is room for local enhancement of this classification system. For instance, the Dominance Type applies to the dominant plant and animal forms found in each system, subsystem, or class. This must be developed by local users of the classification system. According to Cowardin from the abstract published on the USGS website, p. 2, "Types and relationships of plant and animal communities to environmental characteristics must also be developed by users of the classification system." Local enhancement of the Cowardin classification may be helpful in establishing service areas for wetland banks. There is further discussion of the need for local

scientific work in Chapter V.

Wetland Mitigation Planning Tool

The project team imported the digital National Wetland Inventory data for Iowa counties into a planning software tool. For example, Figure 16 shows wetlands in ___ County, Iowa. All of the Cowardin codes were stripped out except for the five noted above typically associated with compensatory mitigation. The tool provides for overlaying the Iowa DOT five-year construction program on the simplified wetlands inventory. It then returns an estimate of the acres in each county likely to require mitigation. The right-of-way can be varied, and the tool will return a new estimate of impacted wetlands.

This is a fairly coarse screening tool, but allows an analyst to spot likely mitigation situations well in advance of construction. If the mitigation need is on the order of 25 acres, a banking solution may be considered. For the current five-year program, Iowa DOT staff have initiated the NEPA process on many segments, identifying thirteen that will likely need wetland mitigation. For these cases, the information is already better than could be obtained from the wetland inventory. However, in the future, such a tool could be useful at the pre-NEPA stage to identify sites very quickly for which mitigation should be budgeted.

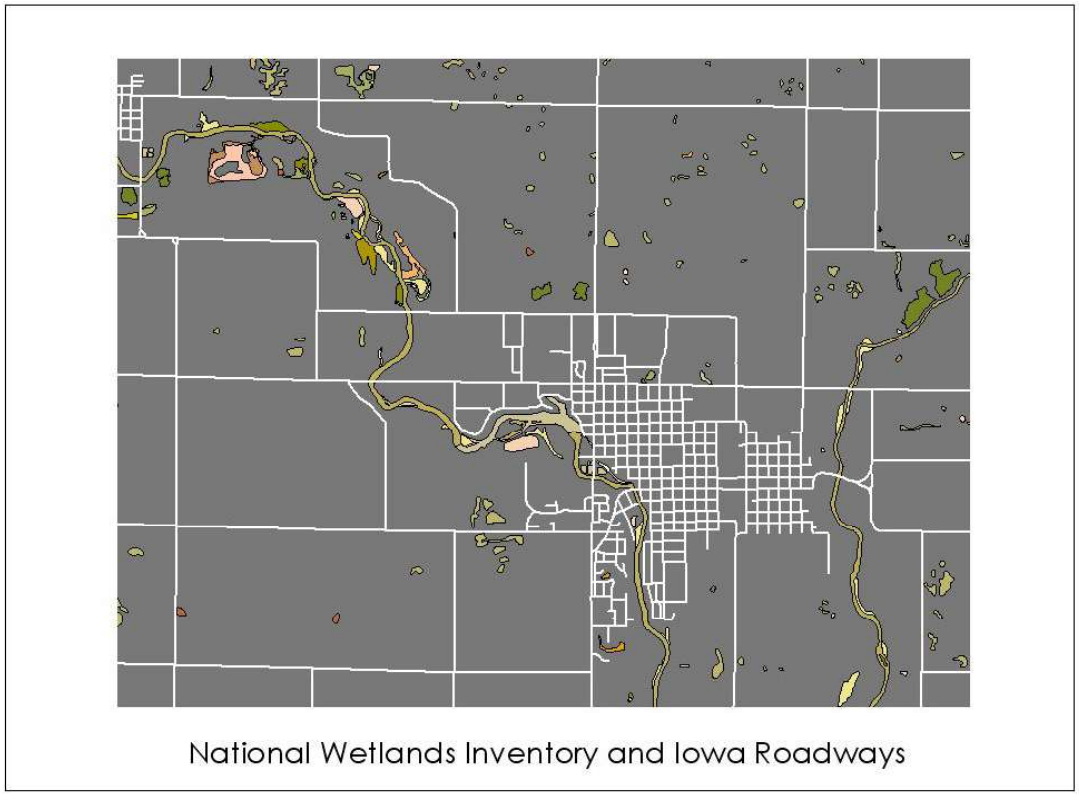

Figure 16. Wetlands in ____ County, Iowa

ASSESSMENT OF NEED FOR COOPERATIVE WETLAND MITIGATION

Need based on volume of activity

The project team attempted to establish a baseline level of wetland mitigation activity to see if this would provide insights for potential cooperative mitigation activities with the Iowa DOT. The survey data presented in Chapter 3 constitute only a sample, not an inventory. Therefore, the team summarized 404 permit applications in an attempt to define an annual level of activity Figure 17 shows the 404 permit applications from 1992-2004.

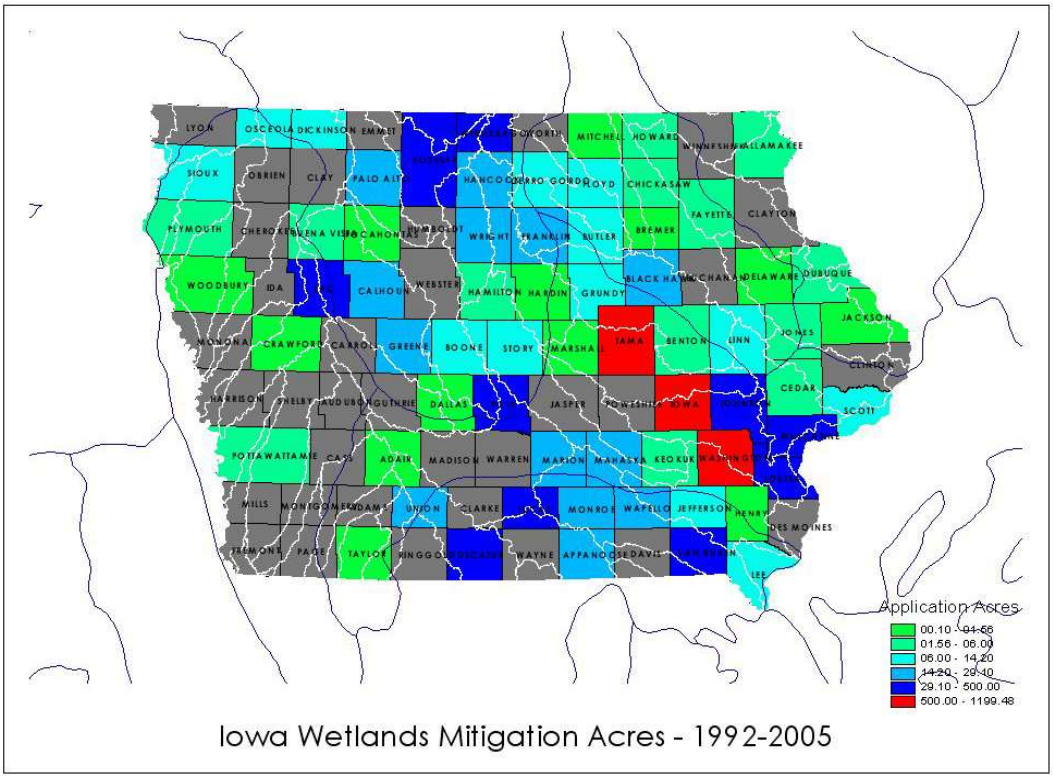

Figure 17. Iowa wetlands mitigation acres 1992-2005

Determining the historical rate of wetland mitigation based on 404 permit data is not easy. The Rock Island District of the US Army Corps of Engineers provided records on 404 permits issued in Iowa since the inception of the program. The volume of permits dropped substantially after the year 2000. From inception through 1999, Corps' records show 404 permits for 13,500 acres. For 2000 and after, records show only 1017 acres. The time periods are not identical, but the point is that there was a major decrease in 404 permits late in the 1990s. This is due partially to the introduction of Nationwide permits in the late 1990's, which provide a categorical exclusion for small impacts of a specific nature. Individual 404 permits are not necessary if Nationwide permits apply, and the Corps must only be informed if a specific Nationwide permit requires it. The rules change for Nationwide permits when they are reviewed on five-year intervals, so the

reporting is not consistent over time. Nationwide permits clearly had the intended effect of reducing 404 permit activity for very small mitigations. Also, the SWANCC decision eliminated the requirement to obtain a 404 permit for wetlands that are not connected to navigable waterways. As a result of these changes, the acreage of 404 permit applications is not a good indicator of the level of mitigation activity.

Despite this caveat, the data do provide some insights. See Table 5.

Table 5
404 Permit Applications from Iowa: January 2000- January 2004
Rock Island District, US Corps of Engineers

Type of Applicant	Number of Applications	Acres	Average Acres per Permit
City	29	48	1.7
County	29	104	3.6
IDALS	5	22	4.4
DNR	19	279	14.7
DOT	36	199	5.5
USFWS	4	39	9.8
Other	3	6	2
Private	93	319	3.4
Total	218	1016	4.7

Given that the MBRT does not feel that anything less that 25 acres warrants the expense and effort of establishing a wetland bank, these data indicate that there are not many good banking opportunities because the level of activity is too small. There have been very few large applications in this four-year period that would approach the 25 acre target. These sites still have to be built, maintained, and monitored for five years, so there is benefit to cooperation, but banking seems like it will be a limited opportunity.

The same data set indicated only three Iowa Counties (cities included in the county data) applied for more than 50 acres in this four-year period.

Butler 79
Johnson 94
Polk 177

These data do not include all wetland mitigation activity, because small activities are handled under Nationwide permits and activity on waterways not connected to the navigable river system do not require permits. However, it seems that the level of wetland mitigation is small except for the Des Moines, Iowa City, and Waterloo-Cedar Falls area.

The 2000-2004 time period was one of economic recession and change in the permitting process. It may not be the best indicator of wetland activity, but it does not suggest many markets for banks.

On the Iowa survey, counties and cities reported mitigating a total 48 acres in the 2000 to 2005 period, mostly in small parcels averaging 1.5 acres. Fifty-two counties and 9 cities responded. The USACE data presented above indicate that permits for 104 acres were issued to counties and cities between 2000 and 2004. The Iowa survey is not a good inventory of the total number of acres mitigated by cities and counties.

Of the 9 cities that responded to the survey, four reported minimal or moderate need for mitigation. This is in the 1 to 2 projects per year range. Fifty–two counties responded and 45 reported no or minimal need for mitigation – 0 to 1 project per year. Six counties reported moderate need (1-2 projects per year) and one county reported great need, more than 2 projects per year. Thirty-one county conservation districts reported. Fifteen of these reported minimal need; 2 reported moderate need; and 3 reported more great need, more than 2 projects per year. No state agencies responded to the survey.

Data provided by Iowa DOT for this project covering 1990 to 2004 shows that the DOT mitigated 1500 acres of wetlands at 128 sites—about 100 acres per year. Iowa DOT also mitigated about 100 acres of woodland, protected under section 314.23, Code of Iowa. This mitigation activity required purchase of 6,200 acres, because the DOT must purchase land on the market from willing sellers. The purchase opportunities do not precisely match the mitigation requirements, so actual purchase of land is about 442 acres per year.

In summary, average annual land purchases by major agencies for restoration or mitigation look something like this:

Iowa DOT: 100 wetland acres for mitigation (442 acres/year purchased to get the wetland)
DNR: 400 wetland acres per year (3000 total acres per year for PPJV)
NRCS Farmable Wetland Program (FWP): 4000-7000 acres per year in 10-15 year leases
NRCS Wetland Reserve Program (WRP): 5000-1000 acres per year

This pattern of mitigation and restoration clearly indicates that the Department of Transportation has the largest and most regular need in the state to mitigate wetlands impacts. The DNR and the NRCS are very active in restoring wildlife habitat, including wetlands. The NRCS program is application driven and budget constrained. The DNR program targets specific areas with the goal of acquiring 1,000+ acre sites. Because there purchases are targeted and always adjacent to exiting sites, the location of DNR purchases does not generally align with locations that DOT needs to mitigate. Urban counties have local needs due to development activity. County conservation districts appear to be willing partners for managing mitigation sites and potential partners for in-lieu fee mitigation.

Based on the volume of mitigation and restoration activity, there may be situational opportunities for cooperative mitigation, but banking opportunities appear limited. The Iowa DOT should be open to banking when it is an option and develop a process to deal with it, but it should not be the cornerstone of the program. The framework recommended in Chapter 6 is designed to identify opportunities.

Administrative Need for Cooperative Mitigation

Despite the low level of mitigation activity reported on the Iowa survey, 83 of 101 respondents indicated interest in cooperative mitigation strategies. The survey confirmed the interest evident from the focus group and confirmed the perceived need for a cooperative mitigation program. Most respondents to the survey that had any involvement with wetland mitigation indicated problems. It seems that the level of administrative effort and concern is very high on this issue, even if it isn't a high volume activity for counties and cities.

Based on the focus group comments, the issues that create an administrative need are:

An apparent lack of interest in wetland mitigation in Iowa.
Failure (nationally) of about half of mitigation sites, in part because they are too small
Lack of a mechanism to share mitigation needs between or among units of government
The survey indicated that most respondents encountered difficulties in mitigating wetlands impacts. Over 25% of respondents reported difficulties of the following type:
- Location of mitigation site
- Functional assessment
- Administrative time
- Project Delay
- Meeting requirements
- Following required procedures
- Monitoring and reporting

Wetland mitigation clearly consume a lot of administrative time. The current system suffers form market inefficiencies, as indicated by the fact that the DOT must purchase four times the land it needs just to get the wetland acres. There is genuine concern about the ecological health of small mitigation sites. However, any agency that must acquire a 404 permit is focused on getting the permit as cost effectively as possible. There is room for administrative improvement.

CONCLUSION

The conclusion of this analysis is that a clearinghouse should be established to help make potential sellers of wetland property aware of buyers. The DOT will continue to do site by site mitigation, but would benefit from awareness of potential sellers. County conservation districts appear to be willing managers of new wetland sites if they are adjacent to current conservation property and do not increase staff expenses significantly. All parties should be opportunistic with respect to banking. If a large DOT need is identified 4-5 years in advance and there is restoration, conservation, or other mitigation activity in the area, the critical mass for a bank may be achieved. If a bank can be created and a manager identified in advance of the DOT project, the conditions may be right. The DOT and MBRT should have a policy in place so that they can take advantage of opportunities. Chapter 5 describes the proposed cooperative mitigation framework.

5. RECOMMENDED FRAMEWORK FOR WETLAND MITIGATION

PRINCIPLES

In developing the framework for cooperative wetland mitigation eight principles were developed, based on the successful practices elsewhere and the comments from the survey and focus group.

1. The cooperative framework for wetland mitigation should be based on improving wildlife habitat and water quality in a watershed. This embraces the national goal of no net loss of wetlands as well as the goals of wetland restoration programs carried out by federal, state, and local conservation agencies.

2. The framework should not place Iowa DOT state resources at risk for building banks in advance of road construction that may not be approved when the project is built. Site-by-site mitigation should be continued in accordance with the sequential process required by the Corps of Engineers. An opportunistic approach to banking should be followed, taking advantage of the option when mitigation needs of the DOT and/or other entities in the area approach 25 acres.

3. The eight-digit Hydrologic Unit Code coupled with the MLRA boundaries will be the initial basis for defining service areas. The MBRT policy of defining service areas as the same HUC 8 or adjacent HUC 8 District in the same MLRA will be followed. However, subsequent scientific work such as that done in Missouri may provide the basis for combining HUC 8 districts into larger service areas based on demonstrated similarities in hydrology, soils, and vegetation.

4. The framework should be based on forecasts of likely wetland impacts due to road construction programmed in the Iowa Department of Transportation 5-year construction program, any known projects by other entities, and known restoration projects planned for the impacted HUC 8 watersheds.

5. The framework should incorporate all of the potential forms of wetland mitigation including avoidance, on-site mitigation, banking, and in lieu fee mitigation,

6. The framework should include a clearinghouse function to facilitate cooperative mitigation, both site-by-site and banking.

7. Decision making should eventually be based on functional assessments of the impacted wetland and proposed mitigation sites. Lacking consensus on functional assessment methods, the current delineation methods recommended by the Corps of Engineers and the National Resource Conservation Service will continue to be used for public lands and farm lands respectively.

8. When banking is an option a market-based approach should be used, if there is a very high probability that the project will be built on the anticipated schedule.

PROPOSED FRAMEWORK FOR COOPERATIVE WETLANDS MITIGATION IN IOWA

Based on the focus group, survey, literature review, and other research, the following framework is proposed for cooperative wetlands mitigation in Iowa. An overview of the framework is shown in Figure 18. The basic elements of the framework provide for an estimation of future wetlands mitigation needs and a possible strategy to address those needs in an efficient, proactive way that would reduce or eliminate construction project delays due to wetlands mitigation issues and would produce more sustainable mitigation project.

The Iowa DOT staff in the office of Location and Environment begins the NEPA process as much as five-years prior to construction, identifying projects that will probably require wetland mitigation. A project budget line item for wetland mitigation is established as early as possible. About two summers before construction, the staff does extensive field work, delineates and classifies the wetland functions and seeks mitigation sites. This is the point where a clearing house of potential wetland sellers would be very beneficial. It is also the point where the DOT should check with the DNR and County conservation boards to see if other mitigation or restoration activities are planned that could be managed cooperatively. (The DOT staff does this already, but it should be part of the framework.)

In some cases, there may not be enough time to start the NEPA process five years early. In this case a "pre-NEPA" GIS scan of proposed highway projects against the National Wetland Inventory would provide a rough indication of potential wetland impacts. The team recommends that this tool be developed for pre-NEPA planning in time-constrained years.

The NRCS wetland programs offer a clearinghouse-like opportunity. As mentioned in Chapter 4, The NRCS Wetland Reserve Program (WRP) has a $60 to $80 million backlog of applicants. The Farmable Wetland Program (FWP) is a 10-15 year lease program, and property is starting to come out of that program. Landowners in both categories may be interested in other options to earn income from or sell wetland property. In a situation where the DOT or any other agency has a mitigation need, the NRCS would be willing to send a mailing to such landowners indicating that there may be another option for them. They would then initiate contact with the DOT or other agency.

If the mitigation need is large enough (25 acres) that banking could be considered, a market based strategy could be employed. This strategy is similar to what other states have adopted (e.g., North Carolina's Ecosystem Enhancement Program) and has been effective in eliminating project delays due to both stream and wetlands mitigation needs.

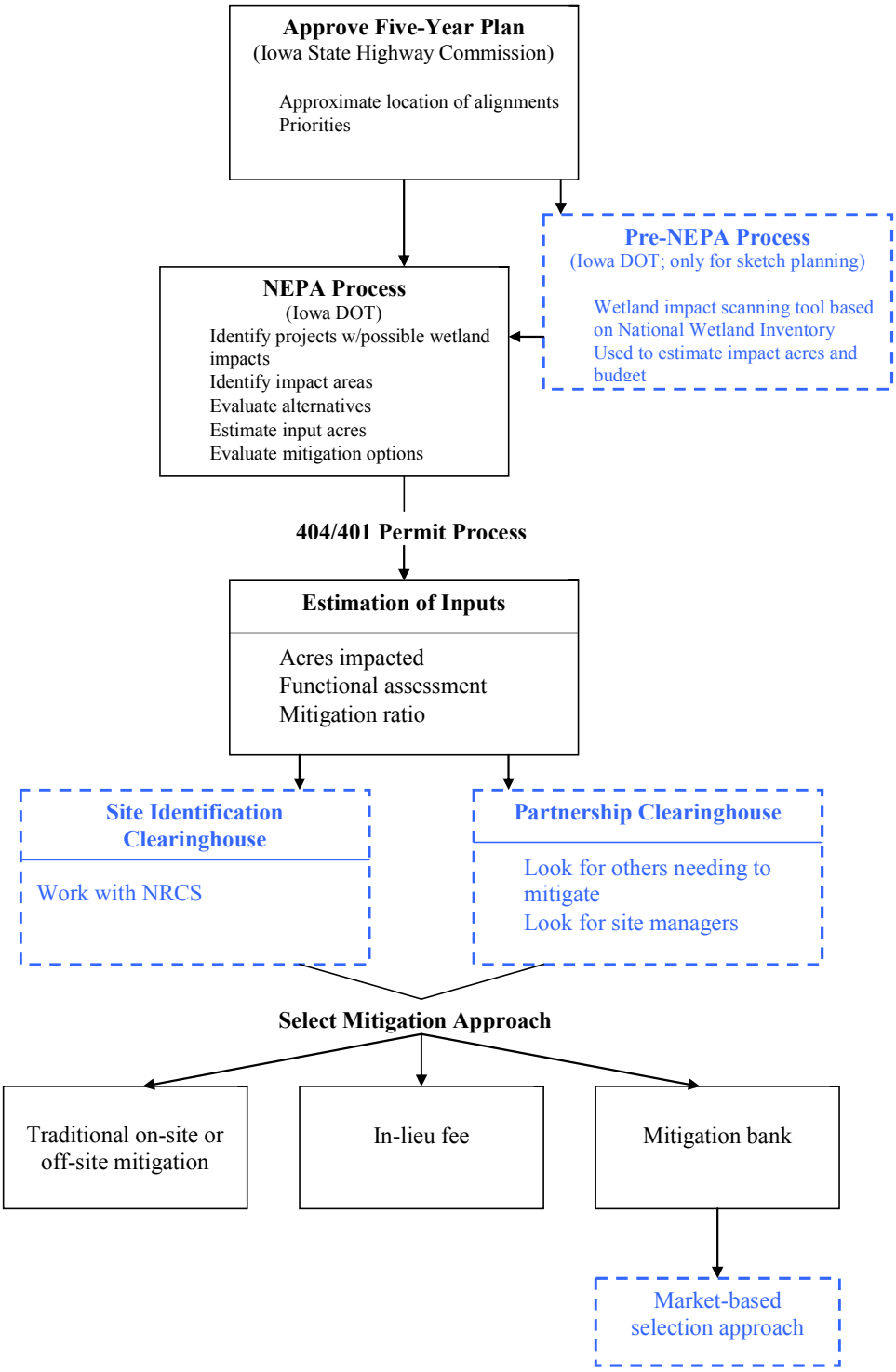

Figure 18. Framework for Cooperative Mitigation in Iowa

Development of long range plan for major transportation improvements

The proposed framework for cooperative wetlands mitigation begins with the development of major transportation improvement projects programmed by the Iowa State Highway

Commission. A new out year is added to the five-year program annually. It is suggested that the 5-year transportation program be used as the basis for the framework, although projected projects beyond the 5-year time frame would be desirable. Transportation projects with the potential for wetlands impacts should be (and are) identified. The five-year plan includes a prioritization of projects and approximate alignments.

The Pre-NEPA Process

In cases where proposed new highway projects must be scanned quickly to determine if wetland impacts are likely or cases where a wetland mitigation budget estimate is needed before there is time to initiate the NEPA process, projects that may have wetland impacts can be mapped on the State National Wetland Inventory map and overlaid with the State's HUC-8 map. This process can be used to identify likely impact areas and the associated HUC-8 districts. The GIS-based mapping tools for this process can allow alternative alignments to be evaluated for the purpose of avoiding and/or minimizing impacts. Once the acreage of likely impacts is determined for each project, a mitigation budget can be estimated and an early decision can be made on potential cooperative mitigation opportunities.

The NEPA process

The NEPA process includes identification of potential impact areas, identification of alternatives, estimation of impacted acres, and evaluation of mitigation priorities.
Circa 1995, the Iowa DOT streamlined the planning process by authorizing the start of NEPA planning before the design hearing that finalizes the right of way for a project. Planning can start with a proposed center line and an approximate right of way defined as a specified number of feet either side of the proposed center line. This allows wetland planning, collecting data for the 404 and 401 permitting process, cultural resources identification, etc. to occur much earlier than previously, reducing project delays caused by discovering environmental issues late in the design process.

404 Permit Process

Two or more years prior to construction, the DOT staff performs detailed site assessments on projects with wetland impacts to obtain the data for 404 and 401 permits. Wetland boundaries are delineated, a functional assessment is performed, and a mitigation ratio is assigned. From this evaluation an estimate of the mitigation acres required for the project can be determined.

Once the estimate of required mitigation acres is determined and the planned year of impact, an evaluation of the mitigation alternatives is conducted. Possible scenarios include traditional on-site mitigation where feasible, off-site mitigation near the anticipated project site, in lieu fees (primarily for small impacts), use of public or private mitigation banks (either new or existing), and privatized mitigation (i.e., the full delivery process as in the North Carolina example). The choice of mitigation depends on the number of acres to be mitigated, the timeline for anticipated impacts, the functional assessment of the wetlands impacted, and the availability of existing mitigation banks in the HUC-8 or adjacent HUC 8 district where impact are to occur.

Clearinghouse Function

At this point the recommended clearinghouse function is engaged. The clearinghouse function has two dimensions. One is to streamline the identification of mitigation sites. The second is to identify partners that also have mitigation needs in the same time frame or that might be potential site managers.

Site identification clearinghouse. The DOT can ask the NRCS to contact Wetland Reserve Program (WRP) applicants that are unlikely to be selected for the WRP program and Farmable Wetland Program (FWP) participants whose lease term is soon to expire. These two groups are likely to contain landowners interested in selling wetlands. Depending on the response opportunities for mitigation sites may arise.

Partnership clearinghouse. This component involves contacting the counties involved, nearby cities and towns, the DNR PPJV staff, the Farm Bureau, the Natural Heritage Foundation, and county conservation boards to find out what else is going on in the area. This may lead to a cooperative mitigation action, a banking opportunity, or a management partner.

On-site/Off-site Mitigation

Traditional on-site mitigation may be the most expedient and preferred choice for wetlands mitigation under some circumstances. For example, if a particular site lends itself to restoration or creation of wetlands, this would be a logical choice for mitigation. As indicated in the Memorandum of Agreement between the USEPA and the Department of the Army (USEPA, 1990), there is a preference for mitigation to be located as close as practicable to impacted areas for the minimization of environmental impacts (e.g., local flooding, water quality, fish and wildlife habitat). If on-site mitigation is not practical or if multiple impacts are anticipated on a project, off-site mitigation may be the preferred option for practical reasons and expediency.

This approach to compensatory wetlands mitigation has been the primary means for the Iowa DOT to comply with the Section 404 regulatory requirements. A recent study (VanDeWalle, 2004) showed that this approach has resulted in wetlands mitigation which has met or exceeded regulatory requirements in almost two-thirds of the cases studied. In an evaluation of 24 Iowa DOT mitigation sites, 14 resulted in wetlands gains ranging from 0.2 to 27 acres. According to the study, there were 10 sites that resulted in net losses ranging from 0.2 to 15 acres. Part of the difficulty in meeting the permit requirements for these sites was the time needed for the vegetation to become established. Another factor sited in the VanDeWalle (2004) study was improper design of the created or restored wetlands. Still other factors cited include confusion regarding permit requirements, particularly related to what constitutes mitigation, enhancement, and or preservation acres. In a review of other States' compensatory mitigation programs, VanDeWalle (2004) reported that Massachusetts and Tennessee experienced shortfalls in mitigation acres of more than 50 and 70%, respectively. These shortfalls were due largely to insufficient acres of mitigation and out of kind mitigation (i.e., wetlands functions that were not replaced).

Cooperative Mitigation

Due to the difficulties in site by site, project by project mitigation, it is evident that cooperative mitigation may provide benefits for regulatory compliance. These benefits include reduced liability (the mitigation bank assumes the liability for creating and maintaining the wetland), reduced project delays (assuming that the mitigation credits are available when needed), and reduced burden for monitoring and reporting. Where project by project mitigation is impractical, the choices for cooperative mitigation consist of in-lieu fee arrangements, traditional mitigation banking, and full-delivery compensatory mitigation. If the acreage to be mitigated is small, an in-lieu fee arrangement may be the most expedient and appropriate strategy.

If an existing mitigation bank exists in the HUC-8 district where credits are needed, this may be the logical choice for compensatory mitigation. An existing mitigation bank should meet certain success criteria prior to the start of construction of a transportation project (D'Ignazio and McDermott, 2004). These criteria include linking mitigation to the impacted watershed and replacing wetlands functions in addition to acres.

If there is not a mitigation bank in the required HUC-8 district and a mitigation need is in the 25 acre, the proposed clearinghouse process should be engaged, possibly leading to a proposal for a new bank. This could be either a private or public bank. At this point in the process, public involvement is critical for the success of the project.

Example: Market-based Approach to Banking Modeled on the North Carolina Full Delivery Process

If a mitigation need approaches the 25 acre level, a banking solution may be considered. In this case it may be desirable to go beyond the clearinghouse stage to a market-based approach comparable to what North Carolina has adopted. North Carolina created the Ecosystem Enhancement Program (EEP), a separate agency established through a memorandum of agreement between the NCDOT, NCDNR, and USACE. We do not recommend this approach for Iowa, but do suggest that the DOT employ the market-based elements of the EEP

Since adopting the EEP process, delays in construction of transportation projects in NC have been reduced if not eliminated altogether (Klimeck, 2005). Prior to the EEP, approximately 40% of all transportation projects were delayed due to mitigation issues. Presently none are. The full-delivery process has the potential advantages as detailed by the National Mitigation Banking Association (2005):

> High standards are set for all mitigation projects, including biological, legal, and financial standards;
> High priority restoration areas, recovery zones, and watersheds are targeted;
> Projects are implemented and tracked;
> Improved project implementation timelines are established, with built-in timelines and regulatory permitting approvals; and
> The efficiencies and cost benefits of the private sector are incorporated into a government program.

While the NC program is run by a separate agency, there is no reason that a similar process could not be administered by the Iowa DOT. A DOT managed program is what is envisioned for Iowa's mitigation framework.

How the North Carolina full-delivery the process works.

According to Suzanne Klimek, the Director of Operations for the NCEEP, the program issues requests for proposals (RFP) periodically for specific acreages needed in designated HUC-8 districts. For instance, according to the NCEEP website (See Figure 19), the next set of RFPs will seek to provide mitigation for approximately 300 acres of riverine wetlands, 270 acres of non-riverine wetlands, 2 acres of coastal marsh wetland, and 238,000 feet of stream restoration. The acreage needs are categorized into the appropriate watershed.

Once proposals are received, the technical proposal is evaluated first. The adequacy of the site is verified (e.g., does the site have hydric soils) and each proposal is given a score. The proposals are evaluated based on their respective scores. If the technical proposal is adequate, then the cost proposal is opened. An adjusted unit cost is determined based on the score from the technical proposal. The proposals are ranked based on the adjusted unit cost. A contract is negotiated with the successful bidder. The contract is administered by the EEP, and monitoring of the site is performed by the EEP (typically they contract out the monitoring part). The Corps approves credits once the wetlands can be shown to be viable and are serving their function. Table 6 illustrates the projects already funded in 2005, showing the scale of the North Carolina program.

The program is successful in restoring wetlands and has virtually eliminated project delays due to mitigation issues. When asked about the cost of the program, Klimek commented that historically, mitigation costs on road projects runs about 2.3% of the actual construction costs (-so the costs are in line with historical costs). Klimek reports the two years since the program's inception, the EEP has provided mitigation for $1.5 billion of road projects at a cost of $36 million. However a DOT auditor, reports that half of the seven-year budget has been spent in two-years and the DOT has some serious financial concerns. The jury is out.

In order for Iowa to take advantage of the market incentives and other efficiencies that a market-based program provides, it would not necessarily need to create a separate entity like the NCEEP. A market-based full delivery process could be administered by the DOT with oversight from the mitigation banking review team. In fact, prior to the creation of the NCEEP, the NCDOT administered a full delivery program (Klimek, 2005).

River Basin	Cataloging Unit	Oct/Nov 2005				March/April 2006			
		Stream (feet)	Riverine Wetland (acres)	Non-Riverine Wetland (acres)	Coastal Marsh Wetland (acres)	Stream (feet)	Riverine Wetland (acres)	Non-Riverine Wetland (acres)	Coastal Marsh Wetland (acres)
Broad	03050105			5					
Cape Fear	03030002	17,000	0	30					
Cape Fear	03030004	25,000	106						
Cape Fear	03030006								
Catawba	03050101	5,000	25	5					
Catawba	3050102			5					
Catawba	03050103	15,000	25	5					
Chowan	03010203			81					
Chowan	03010204	5,000	3	5					
French Broad	06010106		3	5					
French Broad	06010108	45,000	10	5					
Little Tennessee	06010203	15,000	3	5					
Little Tennessee	06010204			5					
Lumber	03040204	5,000	16	5					
Lumber	03040206	5,000	7	15					
Lumber	03040207	5,000	3	10					
Pasquotank	03010205	5,000							
Roanoke	03010102	5,000	10	10					
Roanoke	03010103	8,000	7						
Roanoke*	03010104	10,000		5					
Roanoke	03010106	5,000	14	10					
Savannah	03060101	5,000	3	5					
Savannah	03060102	5,000	3	5					
Tar-Pamlico	03020102								
Tar-Pamlico*	03020105	5,000	16	20	2				
Watauga	06010103	5,000	3	5					
White Oak*	03030001	5,000	17						
Yadkin	03040101			5					
Yadkin	03040104			5					
Yadkin	03040105	38,000	25	10					
Yadkin	03040201			5					
Grand Total		238,000	299	271	2				

This color designation represents future postings under the assumption that all October/November needs are met

* Amount dependent on award of current RFP

Figure 19. Anticipated RFPs to be released by the NCEEP in 2005 and 2006
(from www.nceep.net/business/FDPadvandenotification.htm)

Table 6. NCEEP Full Delivery Program Awards for 2005
(from http://www.nceep.net/business/fulldel05.htm)

Project Name	Basin	Mitigation Units	Contract Amount
Ballance Site	Neuse	50.0 Buffer	$2,050,000.00
Beaverdam Creek	Catawba	12,973 Stream	$2,983,790.00
Big Bull Creek	Neuse	35.0 Buffer	$980,000.00
Black Gum Creek	Lumber	10,000 Stream	$2,010,000.00
Blounts Creek	Cape Fear	7,999 Stream	$2,195,165.57
Brogden Road	Neuse	15.0 Buffer	$420,000.00
Brown Farm	Cape Fear	25.2 Riv WL	$1,638,260.00
Collins Creek	Cape Fear	10,799 Stream	$1,889,825.00
Conetoe Creek	Tar-Pamlico	10.0 Buffer	$194,000.00
Conoconnara Swamp	Roanoke	5,000 Stream; 87.0 NRiv WL	$3,791,300.00
Daniels Farm #2	Tar-Pamlico	15.0 Riv WL	$525,000.00
Gatlin Swamp	Roanoke	125.0 NRiv WL	$1,875,000.00
Glen Raven Site	Cape Fear	3,757 Stream	$1,070,745.00
Gray Farm	Catawba	7,610 Stream	$2,199,290.00
Harrell Site	Tar-Pamlico	8,238 Stream	$1,466,364.00
Harrell Site	Tar-Pamlico	15.0 NRiv WL	$480,000.00
Howard Farm	Neuse	26.3 Buffer	$426,060.00
Little Buffalo	Neuse	27.0 Buffer	$594,000.00
Little Contentnea III	Neuse	54.16 Buffer	$1,098,852.24
Manning Farm	Tar-Pamlico	10.0 Buffer	$148,000.00
Moccasin Creek	Neuse	20.2 Buffer	$427,815.80
Modlin Site	Roanoke	40.0 Riv WL	$1,400,000.00
Pleasant Hill Farm	Neuse	25.0 Buffer	$392,500.00
Randleman Lake	Cape Fear	90.0 Buffer	$3,600,000.00
Reeds Creek	Catawba	5.3 Riv WL	$378,950.00
Silver Creek-Queen	Catawba	4,520 Stream	$1,050,448.00
Simpson Site	Tar-Pamlico	45.0 Buffer	$825,660.00
Simpson Site	Tar-Pamlico	30.0 NRiv WL	$494,400.00
Tarlton Site	Cape Fear	3,800 Stream; 8.0 Riv WL	$1,218,200.00
Whitley Site	Neuse	27.5 Buffer	$976,250.00

Wetland Banking Risks

There are risks associated with wetland banking:

> It is difficult to fund banks in advance of incurring the impact. State road use tax funds must be used to build the bank, and if all goes well, federal funds can be used to by credits from the bank in the future, thereby repaying state funds.
>
> Neither the Iowa DOT, the Department of Natural Resources, nor the Natural Resources Conservation Service are interested in owning and maintaining banks. County Conservation Commissions may manage a bank if it is adjacent to exiting property.
>
> Determination of banking ratios is risk to the DOT and to wetland bankers, because the Army Corps of Engineers determines the ratio. If a bank is built but is not ideally located with respect to a project, the use of credits may be approved but the ration may be increased. This costs the DOT extra money but is financially good for the bank owner. If the use of the bank is not approved, that is bad for both the DOT and the bank owner.
>
> There is no accepted methodology for wetlands assessment. This can lead the Corps of Engineers to disallow the use of a bank for a mitigation, because it does not mitigate the same functions as those impacted. The result is that the money invested in the bank is either wasted or not useable until another project comes along in the same watershed.
>
> Another risk to bankers is changing governmental regulations and personnel that interpret the rules. There is inherent uncertainty.

The North Carolina experience illustrates risks that must be incurred to obtain potential benefits. A disadvantage of the market –based banking process as it is carried out in North Carolina is that it is expensive. In the first two years since its inception, the NCEEP has spent an estimated $36 million on mitigation efforts alone. This amount does not include other activities associated with the EEP, e.g., the in lieu fee program and the watershed planning program. (An NC DOT auditor stated it was more like $175 million.) In the two years that the program has been operating, North Carolina has set aside more than 7,000 wetlands acres for future generations, restored 780,000 feet of stream restoration, and restored 7,600 acres of wetlands. However, The DOT has experienced cases where the Corps of Engineers did not approve withdrawal of banking credits from a bank constructed under the program for mitigating planned highway construction impacts. From a DOT point-of-view this is a waste of highway resources. It may be good for wetland restoration, but that is not the DOT's primary mission. The major risk of banking is that there is no fiduciary guarantee that the Corps of Engineers will approve use of credits from a bank, even if constructed for that purpose. The Corps of Engineers has no mechanism to guarantee or warrantee in advance that it will approve withdrawal of credits from a bank for a future project. There is an inherent risk in the current regulatory climate.

Another risk associated with a market-based banking program is the difficulty in estimating the required number of mitigation acres in advance of construction. The NCEEP uses a 7-year transportation planning process and issues requests for proposals based on the 7-years projected compensatory wetlands mitigation acres. If these highway projects are not built as scheduled or the needed acreage is reduced, then the program may have spent money unnecessarily for mitigation acres that are not used on a project. During the 2000-2004 economic downturn, the DOT scaled back its projections after the RFPs were issued. This was costly for the banking

business, because bankers have already invested time and money to find banking sites and prepare technical and cost proposals. When the proposed highway construction program is scaled back for any reason, this puts a burden on private business. The market-based approach can only work if private firms can be financially successful.

At present, the North Carolina has spent over half of its seven-year mitigation budget in just two years and is very concerned about the extremely high prices being paid for land. They also experienced building a large bank for four proposed bypasses, and could ultimately use the bank for only two. The DOT auditors assigned to the NCEEP program are very concerned.

Summary of Recommendations

1. The Iowa DOT has a very good staff and process in place for obtaining 404 and 401 permits. Project delay for wetland reasons does not seem to be big problem. Permits are obtained in advance of construction. There do not seem to be many instances of DOT mitigations in the 25 acre range, the effective minimum for banking. Therefore, we recommend that the site by site mitigation process continue to be the backbone of the DOT system.
2. The current problems are (1) that to obtain wetland property for mitigation the DOT is purchasing four times the acreage due to the operation of the real estate market; (2) the DOT does not want to manage wetlands or own excess property; and (3) the sustainability of mitigation sites, although good by national standards, could be improved. Therefore, we recommend a *site identification clearing house* involving the NRCS to help identify landowners willing to sell wetlands. The DOT should request that the NRCS contact applicants to the Wetland Reserve Program (WPR) and landowners exiting the Farmable Wetlands Program (FWP) in affected HUC 8 Districts to aid in obtaining mitigation sites. These landowners could then contact the DOT and negotiation would proceed.
3. To help identify other agencies with mitigation needs or potential site managers, we recommend a *partnership clearinghouse.* While this process currently happens, the DOT should routinely contact cities, counties, the DNR, the Farm Bureau, the County Conservation Commission, and the Natural Heritage Foundations as early as possible in the mitigation process to see if others have mitigation or restoration needs in the area or are willing to consider a management contract.
4. A pre-NEPA planning tool could easily be developed from the Iowa portion of the National Wetland Inventory. (The inventory update is incomplete, but we assume the DNR will gradually complete it.) The centerline of proposed highway projects can be overlaid (using GIS) on the Wetland Inventory Map, stripped of all Cowardin codes not generally associated with mitigation. This tool can return estimated acres impacted. This tool would be crude compared to the field inventory conducted as part of NEPA, but it could produce an early acreage and budget estimate. We recommend that the DOT consider such a planning tool.
5. In order reduce the financial risk of wetland banking, the Iowa DOT and DNR should consider a joint effort to develop banking service area definitions (watersheds) larger than HUC 8 and adjacent HUC 8 districts, following the Missouri model. Iowa agencies would need to negotiate with the Rock Island District of the Corps of Engineers in advance to determine the terms that would be acceptable. If this were successful, bankers

and project builders would have the fiduciary responsibility needed to use the banking process more effectively. The justification would presumably have to be based on the environmental benefits of systematic watershed improvement through building or restoring larger wetland sites. Mitigation could potentially be a watershed improvement tool instead of a detriment.

APPENDIX A: COMMENTS FROM THE SURVEY

The written comments from the survey are summarized below for each question. The last set of comments on difficulties encountered is enlightening. The comments suggest a willingness to try banking but considerable frustration with establishing the plans required and with communication. There is clearly room for improvement in the process of actually building, planting, and maintaining a wetland.

What difficulties do you face in mitigating wetland losses?

Creating a wetland with non-indigenous species is not possible.
We have been facilitating mitigation projects for others.

Has your agency ever created, restored, or enhanced a wetland to mitigate wetlands lost for a public or private improvement?

Created:

Cedar County did others before I came on board.
In the last 10 years, not five.
Prior to 2000.
Created but not to mitigate wetlands lost.
As mitigation for 2 bridges.
We only assist the county roads with a mitigation site.
In conjunction with other agencies and private contractors.

Where was the wetland mitigation(s) located?

Both contiguous and within the project limits.
An off-site borrowed area was the "created" wetland.
It was prior to my employment.
Within a county conservation area adjacent to the bridge.
At another bridge construction site.
Also on-site contiguous to project.
One with Lee county conservation district and one with private land owner adjacent to site.
On-site contiguous to the project. Purchased property adjacent to public right-of-way for wetland creation.
Also on-site contiguous to project. All within 1000 feet of project limits.
Placed two in county conservation parks.
Off site.
Off-site, one off-site consolidated mitigation and one site borrow/mitigation combination.
On county owned land.
On-site contiguous to project. In conjunction with FCCB near a road project.
Not very good.
0.239 acres

On-site contiguous to the project.
Found a spot on county property to develop.
One project satisfied mitigation needs for two public improvements. One within county and one in adjacent county.
We provided a site for Rd. dept. to mitigate for bridge replacement offsite on other county conservation board property.
Enhanced an existing oxbow on our county area for a bridge project done by our secondary roads dept.
We are in the process of having several DOT mitigation projects transferred to our agency for management through 28e agreements. We have never taken on projects ourselves.
We provided sites for county secondary roads department in constructing planned wetlands at F.W. Kent Park.

What ratio (mulitplier) was used for the mitigation site?

Don't remember.
Don't know.
1.5 new acres per 1.0 acre used.
And 1.5:2.
Generally
Not sure
For one bridge project.
Minimum of
Unknown, we only provided the land for the mitigation.
3 upland to 1 wetland.
Also used 1.5:1.
Not sure, but believe close to 1:1.
We created a wetland 2 times the size of the area we impacted by our choice as we had a large area to use.
DOT mitigation staff determined this number.
I think.
Various ratios depending on criteria and quality lost.

Did you perform a functional assessment of the wetland mitigation? Please briefly explain the method.

Consultant
Unknown
Don’t know
Submitted proposal to Corps of Engineers.
Not sure what you mean.
Met with local NRCS to discuss site and process to follow.
Yes one has been done by IDNR, County Conservation Counted trees.

Had our roadside manager create an evaluation report and proposed mitigation. It was reviewed by the Corps of Engineers.
Had a consultant do this.
Hired a consultant.
No. Don't know what a functional assessment entails.
Performed by a bridge consultant.
Assisted with sowing work.
Our roadside manager prepared a report for Corps of Engineers to review.
Hired a consultant.
Performed by county naturalist.
We hired a consultant.
NRCS
HEP-like
Done by NRCS**.**
Had to monitor for Corps of Engineers satisfaction.
Functional assessments were done by others.
Had NRCS send a representative to do the assessment.
Done by NRCS.
We didn't, don't know who did.
We have a COE trained delineator on staff.

Did you mitigate the wetland(s) alone or jointly with other parties?

Local conservation and NRCS.

If you partnered (or contracted) with other agencies, how did you do it?

County conservation does the annual monitoring report.
We were paid to provide the mitigation.
The conservation group was responsible for tree planting at the site.
Conservation participated by planting trees.
NRCS helped with design and land owner gave land-got money to develop the wetland.
Transferred wetland to county conservation after constructing wetlands, one of which was on property they maintained.
Assisted mitigation process/exchanged for land.
Engineering dept. designed, administered and constructed. Also secured regulatory permits. County conservation will sustain, develop and monitor the wetland.
We assisted secondary roads dept. with a project.
Assisted with design & site selection, maintenance of site during & after monitoring.
Found area on county property, NRCS did assessment. Secondary roads dept. did dirt work and we seeded the area.

Through 28E agreement. Greene County purchased and developed the wetland, and the DOT provided the funds to do this. Acquisition and development through the county process, bypassed the DOT procedures.
Our dept. (county conservation board provided site secondary rd. dept. did all administration & construction.
County road dept. helped with design to enlarge a wetland and did the physical construction work. They did not charge for their services.
Secondary roads paid an individual contractor experienced in this type of work to build them. They also purchased plants.

How did you finance the wetland mitigation(s)?

Financing was by the parties who incurred the obligations.
Regular budget and in-kind labor.
Developer funded.
Local funds- labor.
County local funds.
County labor.
Local funds.
County funds.
Those needing to mitigate paid. Used county property for new wetlands.
Secondary roads,

How did you staff the wetland mitigation effort(s)?

Conservation staff.
County staff.
County Conservation District
County conservation naturalist.

Did you experience difficulty in maintaining and monitoring the wetland(s) that you developed?

No monitoring requirements at that time.
This is the first one we've done so we'll see how it goes.
County conservation counted trees.
Work is done by LCCD.
Difficult to establish species required during the review process.
We tried to bank wetlands last year since we are constructing six (6) ponds/wetlands this year, but found the banking process so difficult we gave up.
Our consultant recommended that our benefits would be negligible.
Wetland plant identification and 5 year reporting requirements on project are a useless diversion of my time. Unfortunately, getting the wetland built isn't good enough for C.O.E. anymore. We don't have a biologist on staff and don't have time for this extra effort.
Communication with Iowa DOT was not good!

Species required in the review process were not those growing in adjacent wetlands and were not easily or cheaply established.
FCCS has responsibility.
Lack of interest.
We have a good relationship with our local NRCS staff. They have assisted with the reporting.
There is a demand among private landowners for mitigation banks for farmed wetlands. We need to simplify the process and we could have better wetlands and agricultural lands.
We have an area east of Adair, IA that we are willing to construct a wetland on if the DOT or the County needs a site to construct a mitigated wetland.
We currently hold a conservation easement on the Coulthard Wetland mitigation bank in Harrison County. Mitigation banking is a great concept and provides real wetland benefits.
We are in the business of reconstruction and management of wetland areas dba Hamilton County Conservation Board/department.
Our mitigation was done to mitigate a bridge relocation. We used unused right-of-way that was part of the old alignment as our mitigation site. Design was done by the NRCS locally and was sent to the Corp of Engineers and Iowa DNR for approval. No maintenance work to the site has been done.
The wetland is just being developed. We would like to make a list of potential wetland mitigation projects for the DOT to have on file. I think there needs to be a standard procedure for doing this.
We don't have agreement as to who monitors. I assume secondary roads is responsible.

APPENDIX B: SCIENTIFIC, TECHNICAL, AND REGULATORY ISSUES

Development of Wetlands Assessment

Under the Clean Water Act, wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands vary widely, regionally and locally, because of the differences in soils, topography, hydrology, water quality, vegetation, and climate. Wetlands are sites of great complexity that include swamps, marshes, and bogs and vernal pools. They are extremely fragile environments subjected to continuous transformation. Wetlands which were once considered of very little value but disease-ridden places are now viewed as places that can provide many benefits to society. The environmental value of wetlands include the various functions they support such as natural water quality improvement, flood storage, shoreline erosion protection, recreation opportunities, aesthetic appreciation while ecological value may include fish and wildlife habitats, and source of natural products. Anthropogenic pressures on wetlands such as lost of wetlands due to development have prompted development of various methods and procedures to classify wetlands, to estimate their ecological integrity, the type of functions, and their uniqueness.

Some of the earliest reports on classification and value of wetlands date back to as early as the 1950s (Shaw and Fredine, 1956). In the 1970's, scientists, ecologists, and conservationists began to articulate the values of wetlands (Odum et al., 1974; Stegman, 1976; Cowardin et al., 1979). At a wetlands conference in 1973, wetlands were acknowledged to be an important part of the hydrologic cycle (Helfgott et al., 1973) and in 1977, interest in the value of wetlands and the need to protect them was affirmed in the first National Wetland Protection Symposium (Kusler and Montanari, 1978). Section 404 of the Federal Water Pollution Control Act (1972) may be viewed as the first explicit attempt to preserve wetlands functions as a whole with the so-called "no-net-loss" policy being implemented in the 1980s (Carletti et al., 2004). The goal of the "no-net-loss" policy is to maintain the total wetlands surface area by restoring or extending existing wetlands or creating new wetlands elsewhere to compensate for lost of wetlands as a result of anthropogenic pressures. However, it soon was realized that the "no-net-loss" approach may neglect site specific functions of the wetlands necessary to carry out the essential ecological functions (Hruby et al., 1995). In 1981 at the Wetland Values and Management Conference, the unique qualities of wetlands were defined and a list of wetlands functions was developed including hydrologic and water quality functions (Richardson, 1981). As such in the middle of 1980s, the focus on spatial or pure structure of wetlands shifted to include assessment of wetlands functions and environmental performance with wetlands functions and values assuming a greater role in the regulatory program (Carletti et al., 2004).

Wetlands Functions and Values

Wetlands functions may be viewed as a process or series of processes that take place within a wetland (Novitzki et al., 1997). These processes include water storage, nutrient transformations, growth of living matter, and diversity of wetlands plants. Functions of wetlands can be grouped

broadly into four categories, although these distinctions can be somewhat interrelated (Carletti et al., 2004):

- Water - hydrological, both qualitative and quantitative conservation and restoration of the water body
- Erosion - control of erosive effects of alluvial events
- Biodiversity - conservation of communities and habitats
- Anthropic uses - recreational, educational, commercial uses.

NRC (1992) identifies five major wetlands functions that can be used in evaluating wetlands restoration and creation. These are: hydrological functions, water-quality functions, support of vegetation, support of habitat for fauna, and soil functions. The report by NRC (1992) acknowledged that the above five do not represent all the wetlands functions. In US EPA Watershed Academy Training Module (US EPA, 2005), a listing of 9 functions is presented as in Table 1. Wetlands may have one or more of the above functions but wetlands may not perform their functions equally well (Novitzki et al., 1997). The functions the wetlands perform depend on the geographical location and size of the wetlands which will determine the habitat functions. However, many factors such as climate, quantity and quality of water, and disturbances will determine the performance of the functions by the wetlands.

Hydrology has been cited as the primary driving force influencing wetlands development, structure and function (Gosselink and Turner, 1978; Morgan and Roberts, 1999) with development of the appropriate hydrology as a fundamental component to wetlands mitigation whether through restoration or creation (NRC, 1995; Brinson, 1993; Mitsch and Wilson, 1996;

Table 1. Wetlands Functions and Values (US EPA, 2005)

Functions	Values
Fish, wildlife and plant habitats	• source of substantial biodiversity • source of substantial biodiversity • produce great quantities of food • development of organisms that form the base of the food web • birds and mammals rely on wetlands for food, water, and shelter, especially while migrating and breeding • breeding and egg deposition areas (fish, amphibians and reptiles) • estuaries and their coastal marshes serve as important fish nursery areas • some wetlands release cooler water to salmon-bearing streams and rivers • 43% of the federally threatened and endangered species rely directly or indirectly on wetlands for their survival
Natural water quality improvement and biogeochemical cycling	• wetlands provide the conditions needed for the removal of both nitrogen and phosphorus from surface water • improve water/drinking water quality by - - intercepting surface runoff - removing or retaining inorganic nutrients - processing organic wastes - reducing suspended sediments • wetlands also reduce environmental problems such as algal blooms, dead zones, and fish kills, that are generally associated with excess nutrients.
Atmospheric maintenance	• wetlands world-wide help moderate global climatic conditions • store carbon within their live and preserved (peat) plant biomass instead of releasing it to the atmosphere as a greenhouse gas
Hydrologic cycle roles	• receive, store, and release water in numerous ways • some wetlands maintain stream flow during dry periods • some wetlands replenish groundwater
Flood storage	• store and slowly release surface water, rain, snowmelt, groundwater and flood waters

	• wetlands vegetation also impedes the movement of flood waters and distributes them more slowly over floodplains • counteract the greatly increased rate and volume of surface-water runoff from pavement and buildings
Shoreline erosion protection	• protect shorelines and stream banks against erosion • hold the soil in place with their roots • absorb the energy of waves • break up the flow of stream or river currents
Opportunities for recreation, education, research and aesthetic appreciation	• used to hunt, fish, bird watch or photograph wildlife • nature-based tourism involves birds, many of which are wetland-dependent • used for hiking, boating, and other recreational activities • studied in conjunction with environmental programs • excellent research and teaching sites to learn about vegetation, ecological functions and processes, biodiversity, and plant-animal interactions • artists and writers capture the beauty of wetlands on canvas and paper, or through cameras, and video and sound recorders
Economic benefits of natural services and products at little or no cost	• wetlands filtering function saves us a great deal of money • wetlands supporting timber totals about 55 million acres • blueberries, cranberries, mints, and wild rice, are produced in wetlands • medicines from wetlands soils and plants • fishing and shell fishing industries harvest wetland-dependent species • habitats for commercial fur-bearers like muskrat, beaver, otter, and mink, as well as reptiles such as alligators • 3 million migratory bird hunters generated $1.3 billion in retail sales
Reduce flood damage and protect our health and safety	• reduce the likelihood of flood damage to homes, businesses, and crops in agricultural areas • lower flood heights and reduce erosion downstream and on adjacent lands • reduce or prevent water logging of agricultural lands • less monetary flood damage (and related insurance costs), as well as greater protection of human health, safety, and welfare.

Cole and Brooks, 2000). A survey conducted by Holman and Childres (1995) on professionals working on wetlands restoration indicated that hydrology was one of the most difficult structural features of a wetlands to establish and the most important component of a project.

Associated with the wetlands are the values derived from the functions of wetlands. Table 1 lists the values that are associated with the various functions of the wetlands. However, it is difficult to associate certain values with a single function of the wetlands since the value of a wetlands such as recreation (hunting, fishing, bird watching) is usually a combination of several, if not, all of the functional processes that work together to create and maintain the wetland. The values are the benefits wetlands provide to the environment or to people and may be difficult to measure. National Audubon Society (1993) states that "while wetlands functions are natural processes of wetlands that continue regardless of their perceived value to humans, the value people place on those functions in many cases is the primary factor determining whether a wetlands remains intact or is converted for some other use." Values assigned to wetlands functions may change over time depending on the perceptions and priorities of society. In the preservation of wetlands, "society may have to choose among wetlands functions that benefit individuals or small groups, that are of value to most of society, or that are important to the maintenance of the wetlands itself" (Novitzki et al., 1997).

Functional Assessment

Functional assessment is the process by which the capacity of a wetlands to perform a function is measured or estimated. One of the earliest reviews of assessment methods or procedures was that of Lonard et al. (1981) who reviewed assessment methods developed prior to 1982 with the

purpose of determining the feasibility of using them in 404 regulations of the Clean Water Act (33 U.S.C. 1344, Section 328). They concluded that the methods reviewed were not appropriate and recommended specific revisions to make them more useful. A review of assessment methods conducted by U.S. EPA (1984) found that none of the methods reviewed had "...the potential ability to determine the adverse effects of projects on wetlands functions." In 1995, Smith et al. (1995) indicated that despite the availability of a variety of methods, none have received widespread acceptance or utilization in 404 regulations at a national scale. Smith et al. (1995) indicates that the methods did not meet one or more of the technical requirements of 404. These requirements include:

- A standardized and documented approach
- Applicability throughout the public interest review sequence
- Applicability across the geographic extent of the Corps regulatory jurisdiction
- Applicability to a variety of wetlands types
- Applicability to a variety of wetlands functions
- Compatibility with the time and resources available for the public interest review process
- Accuracy and precision that is consistent with the time and resources available
- Sensitivity to different types of impacts at levels at which wetlands functions are affected
- Adaptability to a variety of regulatory, management, and planning applications
- Defined standards of comparison
- Capability to incorporate new technical information as it becomes available
- Capability to incorporate new and changing programmatic requirements

The great variability in the structural characteristics and processes of wetlands in the U.S. makes assessment of wetlands functions difficult (Mitsch and Goselink, 1993). Different approaches have been advocated to reduce the variability including the classification of wetlands into regional wetlands subclasses based on the hydrogeomorphic features as recommended by Brinson (1993). Typically, assessment methods assign numerical values to wetlands functions to assist planners, regulators or the public to evaluate a wetlands to make the decision-making clearer. Another approach is to assign values on the basis of the benefits to the wetlands itself by determining the importance of the function for the maintenance of the particular wetland. Other methods may include assigning value to the benefits the surrounding ecosystems or to humans may receive such as the impact of environmental quality downstream. Because of the complexity of wetlands and the subjective nature of some of the values, a single assessment method to fully capture the functions or values of the wetlands may not be possible. Therefore, no one method will satisfy all needs and the demands of different constituencies.

The following website (National Inventory Survey/Tools for Ecological Assessment http://ecosurvey.gmu.edu/CompiledMethodsFrameset.htm) maintained by George Mason University for National Park Service (NPS) has a listing of about 144 assessment methods or tools developed by different federal, state, county and non government agencies. The assessment methods listed cover functions such as hydrological, wildlife habitats for four groups of wetlands: stream, tidal wetlands, upland wetlands and freshwater wetlands. The website indicates that NPS is reviewing and comparing each of the assessment method and will develop a decision matrix to aid users in selecting a method. This summary which is anticipated to be

ready in 2005 will also include key descriptors of each method and case studies to illustrate how the methods are used.

Novitzki et al, (1997) evaluated three wetlands assessment methods. They were: (i) Wetlands Evaluation Technique (WET) developed for the Federal Highway Administration, (ii) Environmental Monitoring Assessment Program – Wetlands (EMAP-Wetlands) developed by the U.S. Environmental Protection Agency, and (iii) Hydrogeomorphic (HGM) approach developed by the U.S. Army Corps of Engineers. They concluded that WET and HGM can assess wetlands functions of individual wetlands and its values to humans and other living matter. WET and HGM can be applied to estimate the amount of mitigation required to offset unavoidable wetlands loss, as well as to evaluate the degree of success of individual mitigation projects. WET, however, is only suitable for individual wetlands and is rather cumbersome or wieldy to use on a regional basis while HGM can be applied on a regional basis. As for EMAP-Wetlands, this method was useful in evaluating trends in wetlands conditions over time such as the impact of policy decisions such as “no net loss” and programs such as mitigation banking.

Fennessy et al. (2004) evaluated a total of over 40 methods using the following criteria: (1) it measures the current condition, (2) is rapid, (3) can be used for on-site assessment, and (4) the assumptions of the method can be verified. Out of the 40 methods, 16 were selected for more detailed evaluation. The assessment methods evaluated were divided into a hierarchy of three levels of varying intensity and scale: (1) Level 1 - broad, landscape-scale assessments, (2) Level 2 - rapid field methods, and (3) Level 3 – intensive biological and physico-chemical measures. In their assessment, they identified 4 core elements (hydrology, soil/substrate, vegetation and landscape setting) along with the major categories of indicators (see Table 2). The number of methods employing a particular indicator is also listed in Table 2. They found that there is wide variation amongst methods in the definition of wetlands assessment area. They also cautioned that certain methods may require "creating a different version of the assessment method for each wetlands class in the region" and therefore the use of *a priori* classification scheme to segregate sites before use of the rapid assessment method can be problematic since different versions of a

Table 2. Major categories of indicators in review of rapid assessment methods (16 methods) (Fennessy et al., 2004)

Core Element	Indicators developed for, or based on	Number of methods employing indicator (16 maximum)
Hydrology	Hydrologic alterations (stressors)	14
	Hydro-period	9
	Type of outlet restriction	8
	Water quality	8
	Surface water connectivity	7
	Flood storage potential	7
	Groundwater recharge and/or Discharge	4
	Water source(s)	3
	Degree of water level fluctuation	3
	Maximum water depth	1
Soils/substrate	Soil type	4

	Substrate disturbance	2
	Presence of mottles	1
	Depth of A horizon	1
	Munsell color (matrix/mottles)	1
	Micro-topography	1
	Sediment composition	1
Vegetation	Number of vegetation classes	12
	Degree of interspersion (community types or open water)	8
	Extent of invasive species	8
	Vegetation alterations	6
	Habitat value to wildlife	5
	Endangered/threatened species, their habitat or communities	4
	Coarse woody debris	3
	Dominant Vegetation	2
	Plant species diversity	2
	Area of open water	1
Landscape setting	Surrounding land use cover	14
	Connectivity to other wetlands or Corridors	8
	Extent of and/or vegetation type in buffer zone	7
	Extent of human land use in Buffer	5
	Wetlands size	5
	Ratio of wetlands to watershed size or watershed size	3
	Land use in watershed	3
	Wetlands morphology	2
	Position of wetlands in watershed	1

method has to be separately validated. Many of the functional assessment methods reviewed did not provide information on the condition of the ecosystem making it difficult to compare the relative condition or extent of anthropogenic impacts between sites. Another concern highlighted by the authors is that for some functional methods, the definition of the highest level of a function does not necessarily equate with the high ecological condition. Scoring can also be problematic as some methods leave the ultimate result of the assessment to the "best professional judgment" of the user, or to some "gut level reaction."

A recent review by Carletti et al. (2004) compared 17 different assessment methods (see Table 3). All 17 methods are listed in the above NPS website. In their review, they found that most of the methods perform an integrated assessment ranging from a minimum of 6 indicators for the Wetlands Rapid Assessment Procedure (WRAP) to a maximum of 78 indicators for the Descriptive Approach (DA) covering different aspects of the structure and functional services provided by wetlands (Carletti et al. 2004). They found that 13 of the 17 assessment methods were developed for the purpose of land planning. Three of the 17 wetlands assessment methods evaluated (HGM, MNRAM and NEFWIBP - see Table 3) used reference-based system, i.e., a

well-conserved 'site' to calibrate the assessment procedure. Carletti and co-workers argued that with a reference site it is very hard to define "an optimal level of integrity as it relies on the principles of the 'best professional judgment." As in the findings of Carletti et al. (2004), the report by NRC (2001) indicated possible shortcomings in comparing mitigation sites with reference systems. Of the 17 methods, the authors found that the modular approach of the Massachusetts Wetlands Assessment (MASS), developed by Massachusetts Office of Coastal Zone Management (MCZM), was promising, combining short term assessment benefits with the precision of detailed field analysis of biogeochemical parameters that usually requires more time and financial resources (Carletti et al., 2004).

Through the 1997 National Action Plan, a National Interagency Implementation Team consisting of the Corps of Engineers and other Federal agencies will identify a strategy to implement the Hydrogeomorphic (HGM) approach for assessing wetlands functions by developing regional guidebooks (Federal Register, 1997). The National Action Plan is not policy but is a document that states the strategies the Federal agencies will follow in developing regional HGM Approach guidebooks. The HGM Approach is a tool to be used in making regulatory decisions, at a Federal, state, or local level for applications such as mitigation banking and watershed planning. The HGM Approach was designed to satisfy the need for better information on wetlands functions within the programmatic requirements of the Clean Water Act Section 404 regulatory program, increasing the accuracy and replication of wetlands function assessments and reducing the amount of time required to conduct a wetlands function assessment. Reactions to the use of HGM Approach in the National Action Plan include whether models can accurately predict functions and the inability of the HGM approach to assess wetlands values such as the functional capacity indices resulting from the HGM Approach which cannot be equated to the societal or economic value of the particular wetlands function. However, the HGM Approach is an approach to create a consistent set of procedures and techniques for identifying wetlands and assessing their functions.

Table 3. List of the 17 Wetlands Assessment Methods Reviewed by Carletti et al. (2004)

Method	Acronym	References
Coastal method, New Hampshire	CT method	Amman et al. (1986), Cook et al. (1993), Amman and Stone (1991)
Descriptive approach	DA	US Army Corps of Engineers (1995)
Evaluation for Planned Wetlands	EPW	Bartoldus et al. (1994)
Hydrogeomorphic Approach	HGM	Brinson (1993)
Models for Assessment of Freshwater Wetlands	Larson Method	Golet and Larson (1974)
Maine Citizen	TMG CTMG	Bryan et al. (1997)
Method for the Assessment of Wetlands Function	MDE method	Fugro East (1995)
Massachusetts Wetlands Assessment	MASS	MCZM (1995)
Minnesota Routine Assessment Method	MNRAM	Minnesota Board of Water and Soil Resources (1998)
North Carolina Coastal Region Evaluation Of Wetlands Significance	NC CREWS	Sutter and Wuenscher (1996)

New England Freshwater Wetlands Invertebrate Biomonitoring Protocol	NEFWIBP	Hicks (1997)
Rapid Assessment Procedure	RAP	Magee (1998)
Stony Creek WAP,	SC	Tilton et al. (1997)
Virginia Institute of Marine Science Method	VIMS	Bradshaw (1991)
Wisconsin Rapid Assessment Methodology	WIRAM	Wisconsin Department of Natural Resources (1992)
Wetlands Rapid Assessment Procedure	WRAP	Miller and Gunsalus (1997)
Washington State WFAP	WSW	Hruby et al. (1998)

Banking Service Area

Add discussion

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APPENDIX C: WETLANDS MITIGATION BANKING INSTRUMENT

Introduction
This banking instrument for Iowa Department of Transportation (IDOT) is supplemented by the Wetland Mitigation Banking Prospectus. Please refer to that document for further information on the banking process. These documents were developed according to *Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks [60 FR 58605-58614].*

Goals and Objectives
To establish wetland mitigation banks throughout the state to allow IDOT to mitigate authorized adverse impacts to wetland and/or aquatic resources.

Bank Ownership
IDOT will strive to first acquire permanent surface easements from current owners. Such easements will specify management to ensure continued maintenance of wetland functions. If permanent easements are not acceptable to the landowner, IDOT, will acquire appropriate properties for bank development and then seek to have a resource agency, such as the Iowa Department of Natural Resources (IDNR) or Natural Resource Conservation Service (NRCS), take title and manage the banked land as a permanent wetland. Third-party agreements will ensure that all conditions of the bank site plan are met. The U.S. Army Corps of Engineers (USACE) will have approval authority of all third-party agreements.

The Mitigation Banking Review Team (MBRT) will coordinate mitigation banking activities in Iowa for regulation by the USACE, NRCS, USEPA, and/or IDNR. Mitigation banking instruments, designated service areas, mitigation sites, and associated wetland credits shall be subject to final approval by the MBRT.

Bank Size, Types, and Classes of Wetlands and Other Aquatic Resources
IDOT will seek to establish wetland mitigation banks within each physiographic region of the state. Each wetland bank will have an individual site plan, which will include:

- Goals and objectives for the site
- Preliminary site development plan
  - Diverse aquatic and supporting landscapes (e.g., shallow open water, riparian wetlands, deep and shallow marshes, floodplain forests, wet meadows and prairies, and upland buffers) that are interrelated to maximize wetlands functions and values
  - Diverse wildlife habitats and associated edge conditions
  - Associated upland buffer areas contiguous to the wetlands to protect the wetlands from potential adverse effects of adjacent land uses, specifying the width, plant community type, and area of all such zones
  - A maximum of wetland area, but not without regard for inclusion of associated uplands
  - Wetland functions that will be restored, enhanced, or created by maximizing vegetative diversity and abundance, structuring specific wildlife habits, optimizing wetland hydrology, and providing public access
  - Species native to the area
  - The type and source of soils
  - The means for establishing and maintaining the appropriate hydrology

Design, maintenance, protection, and monitoring procedures which minimize energy needs, human intervention, and costs, ideally requiring only periodic wee and pest control and/or prescribed burnings, and minimal fencing and runoff control

Map
Location (latitude and longitude coordinates)
Ownership and/or easement (legal description of bank property)
Area (size)
Type of wetlands
Other aquatic characteristics, e.g. salinity, alkalinity, etc
Baseline conditions (vegetation, soils, water quality, other apparent resources including characterization of associated upland areas to be included in the bank site)
Development/establishment plan (engineering design and vegetative establishment plan)
Water rights assigned to the site or statement on water source and reliability
Geographic service area
Types of impacts suitable for compensation
Reporting and monitoring protocols
Contingency and remedial actions and responsibilities
Compensation ratios
Provisions for long-term management and maintenance
Methods for determining credits
Performance standards for determining credit availability and bank success
Accounting procedures
Procedures to conclude the operational phase of the bank

Site Selection

Wetland mitigation banking site selection process will incorporate the following:

Suitability of site to meet the goals and objectives of the bank
Site must possess the physical, chemical, and biological characteristics to support the establishment of the desired aquatic resources and functions
Size and proximity of other ecological features
Source and adequacy of water; may include hydrology model or water budget
Compatibility with adjacent land uses and existing watershed plans
Concern for the protection of cultural resources and habitat for federal or state-listed threatened and endangered species
Anticipated land use changes in the area
Water quality and floodplain management goals
Potential for chemical contamination
Technical feasibility – sites are designed to be self-sustaining
Bio-engineering procedures to be used
Restoration will be the first option, followed by creation, enhancement, and preservation or a combination thereof. Only in exceptional circumstances will preservation be authorized as the sole basis for generating credits. Refer to the *November 28, 1995 Federal Register* for guidance.
Consideration for inclusion of upland areas necessary to increase the overall ecological functioning of the bank site

Methods for Determining Credits and Debits
IDOT will submit a written request for credit certification when they believe wetland development at the bank site has met bank goals and represents a stable wetland ecosystem. IDOT will apply for debits from the bank based on the requirement to mitigate permitted impacts within the bank's geographic service area. Unless a bank site is specifically set up to allow for advance credits, the bank will always maintain a positive credit balance. If a deficit condition should develop, use of the bank will be temporarily suspended until a positive balance is attained. Available credits will be determined by the USACE in consultation with the MBRT upon written request for certification from IDOT.

The bank site plan will establish the goal for development of particular wetland communities and methodologies for measuring credits.

> *For example: In-kind credits may be based directly on acreage, while out-of-kind credits will be based on a functional analysis approach that can be translated to acres.*

Higher ratios may be required for any requested advance credits, out-of-kind credits, enhancement credits, etc. The bank site may also establish applicable guidelines for the use of credits.

> *For example: Impacts associated with projects authorized by nationwide permit within the bank's geographic service area. In-kind mitigation for impacts authorized by an individual permit only after on-site alternatives have been exhausted.*

Any proposal by IDOT to receive credits for wetland enhancement must include a methodology to compare change between baseline and developed conditions at the bank site. If bank credits are determined on an acreage basis, and enhancement is demonstrated by a functional analysis technique, it must be possible to translate functional analysis scores, indices, etc, to acres. The functional assessment methodology utilized will be the same for both debit and credit determinations.

Debits may occasionally be requested prior to full bank site establishment due to urgent near-term mitigation requirements. Such withdrawls are permitted under federal guidance. Limitations on pre-crediting will be established in the site plan. Such credits will never exceed a small percentage of a conservative estimate of projected credits available at certification. The exact percentage will be determined on a site-by-site basis. The bank site plan must be approved by the USACE prior to any pre-crediting.

Long-Term Management, Monitoring, and Remediation
1. Long-Term Management
   Wetland mitigation bank sites will be protected in perpetuity with appropriate legal arrangements (e.g., conservation easements, transfer of title to federal or state resource agency or non-profit conservation organization). These arrangements will seek to restrict harmful activities that might otherwise jeopardize the purpose of the bank. Each bank site plan will identify the entity responsible for long-term site management. IDOT may enter into third-party agreements for long-term site management subsequent to site plan approval, pending review and approval by USACE.

A copy of as-built drawings and specifications will be provided to USACE within 60 days of completion of grading/construction activities for each bank site. All third-party agreements are subject to the approval of the USACE.

2. Monitoring
   IDOT will use established procedures developed for monitoring wetland mitigation sites to meet USACE requirements. A copy of these procedures is attached and is hereby made a part of this instrument. Monitoring frequency and duration will be prescribed in the site plan. IDOT will provide a copy of all monitoring reports for the calendar year to each MBRT member by December 31.

3. Remedial Action
   IDOT will normally use monitoring procedures to determine the need for remedial actions. However, necessary remedial actions may be identified and undertaken in between monitoring periods. A need that arises between scheduled monitoring events may be identified by any member of the MBRT or the public. IDOT will ask the MBRT to review and approve any remedial action unless such a delay would cause extensive loss of ecological functions. In such cases, USACE and IDOT reserve the right to apply remedial actions prior to receiving full MBRT endorsement. IDOT will not be required to perform any remediation for adverse impacts to certified and utilized credits that are due to changes in the adjacent land use or natural disasters that are beyond their control.

Performance Standards for Determining Credit Availability and Bank Success
IDOT wetland mitigation banking sites will initially be monitored on at least an annual basis. Under normal circumstances, IDOT will not request certification of bank credits until the site is ecologically stable and fulfilling the objectives of the bank. This data will be used to determine when the site has reached an ecologically sound, self-sustaining condition. At this time, IDOT will seek to have the USACE, with MBRT concurrent, certify that this site meets the objectives of the bank and the appropriate acres will be credited and made available for withdrawl. IDOT may request partial certification of potential credits if different sections of the bank site establish at different rates. Once available credit at a bank site (or section of a bank site) is certified, that certification will not be revisited. Areas proposed for credit certification must meet the criteria for a jurisdictional wetland as found in the USACE *1987 Wetland Delineation Manual*, including any updates.

Performance standards may be set for any characteristic that influences wetland functions. Performance standards consisting of measurable success criteria will be established for each bank site to determine if bank goals have been met. Criteria must be specific, measurable, and attainable.

> *For example: Goal: create 10 acres of palustrine, emergent seasonal wetland. Avoid Typha spp. monoculture.*
>
> *Determine water regimes by direct observation of site conditions and/or monitoring wells, or infer from indicator status of dominant species. Determine emergent wetland plan acreage from on-site data or from scaled aerial photography. Open water areas greater than 0.2 acres in size will not be included. After three complete growing seasons, canopy coverage of Typha spp. will not exceed 30%.*

For example: Goal: native species will dominate created mitigation sites.

Species dominance is defined as 50% occurrence in one square meter frequency plots placed at 6-meter intervals along permanent transect lines. After three complete growing seasons, at least 75% of the species meeting this definition of dominance will be native species.

Accounting Procedures
IDOT will apply to the USACE for certification of available credits for each bank site. IDOT will then enter the agreed-upon credits into the banking ledger maintained for each bank site. The ledger will accurately reflect the certified credits, categorized by Cowardin classification (or other descriptors, as specified in the site plan). Credit withdrawls must be approved by USACE prior to their utilization by IDOT. IDOT will record all debits in the ledger. IDOT will provide an annual copy of the ledger to the MBRT chair by December 31 of each year the bank is in operation.

Financial Assurances
IDOT wetland mitigation process is funded as a part of each construction project. This may be done with either federal or state funds. IDOT is financially supported through state and federal actions as authorized by legislation. This authorization includes a portion of the taxes collected from the sale of gasoline. IDOT anticipates no difficulty in meeting its obligations for funding of wetland mitigation banks as specified by law, rule, or regulation.

Document Updating and Revision
It will be necessary to modify this document as new laws, regulations, and guidance pertaining to mitigation under Section 404 requirements as promulgated. Ideas for improving this document will be come apparent as the signatory agencies gain practical banking experience. Any member of the MBRT may propose a revision to the chairperson, who will coordinate the proposal with all signatory partners. Changes will be made upon concurrence by responding members of the MBRT. IDOT will be responsible for maintaining the master copy of the Banking Instrument and forwarding updated copies to all MBRT members.

Termination of Banking Instrument
In the event that a mitigation bank does not meet the terms of its banking instrument for any reason, the MBRT shall specify to the bank sponsor a reasonable period of time in which to bring the bank into compliance. If modifications to the banking instrument are necessary, the MBRT will coordinate recommended changes. If the bank continues to fail to meet the terms of its banking instrument, the MBRT may revoke the instrument and remaining financial sureties may be forfeited.

Definitions
Avoidance: The act of eliminating an impact altogether by not taking a certain action or parts of an action.

Bank Site: The location of an individual mitigation bank.

Certified Credit: Credits that have been certified for withdrawl from the mitigation bank by the USACE at a bank site.

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

Conditional Credit Certification: A format determination by the MBRT that mitigation bank credits will be generated, based on demonstrable progress toward becoming certified credits, and will be available for compensatory mitigation purposes.

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

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

Credit Certification: A formal determination by the MBRT that mitigation bank credits have been generated and are available for compensatory mitigation purposes. Certified credits result from fully meeting all certification standards.

Credit: Debit Ratio: The relational balance of mitigation (credits) needed to offset the adverse impacts (debits) to wetland resources, in the interest of achieving replacement of those resources.

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

Designated Service Area: The designated service area of a mitigation bank is the HUC 8 watershed in which impacts have occurred, and any adjacent HUC 8 watershed within the same MLRA (Major Land Resource Area, designated by NRCS).

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

Functional Assessment: A method of estimating functions (such as water quality, wildlife habitat, etc) by identifying and quantifying wetland characteristics, including on-site biophysical features (such as soil, vegetative cover, and hydrology) and landscape context (such as proximity to certain features of natural and human landscapes).

Functions: The ecological (physical, chemical, and biological) processes or attributes of a wetland without regard for their importance to society. Examples of wetland functions include food chain support, provision of ecosystem diversity and fish and wildlife habitat, flood-flow alteration, groundwater recharge and discharge, water quality improvement, and soil stabilization.

Geographic Service Area: The service area of a mitigation bank is the designated area (e.g., watershed, county) wherein a bank can reasonable be expected to provide appropriate compensation for impacts to wetlands and/or other aquatic resources.

Growing Season: The period between May 1 and October 10. This growing season is for purposes of this document alone, and is used to establish performance periods for determining compliance with re-vegetation standards. It does not establish the growing season for wetland delineation.

HUC 8: Hydrologic Unit Code 8 watersheds designated by the U.S. Geological Survey.

In-Kind Mitigation: Wetland loss replaced with wetlands from a mitigation project of the same or similar type.

Ledger: The document to be used in accounting of certified credits and debits which will be maintained by IDOT and reviewed by the USACE.

Management: Actions taken within mitigation bank wetlands to establish and maintain desired habitat conditions that are self-sustaining over time to the maximum extent possible.

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

Mitigation Bank: A site where wetlands and/or other aquatic resources are restored, created, enhanced, or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources. For the purpose of section 404, use of a mitigation bank may only be authorized when impacts are unavoidable.

Mitigation Bank Review Team (MBRT): An interagency group of federal, state, tribal, and/or local regulatory resource agency representatives which are signatory to a banking instrument and oversee the establishment, use, and operation of a mitigation bank.

Monitoring: A specific program of data collection that documents the physical, chemical, and biological characteristics of the mitigation bank wetlands, for the purpose of determining attainment of bank goals and compliance with performance standards.

Off-Site Mitigation: Wetland replacement located outside of the tract or property, but within the same designated service area where wetland impacts will occur.

On-Site Mitigation: Wetland replacement within the same tract or property where wetland impacts will occur.

Out-of-Kind Mitigation: Wetland loss replaced with wetlands from a mitigation project of a different wetland type.

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

Prospectus: A preliminary plan for a wetland mitigation bank, prepared by the bank sponsor and submitted for consideration to the MBRT and other principals involved in the review and approval of banks.

Remediation: Action taken to correct unforeseen deficiencies in a mitigation project.

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

Site Plan: The document that details site location construction, operation, management, maintenance, and monitoring requirements, as outlined generically in this banking instrument, for individual bank sites.

Sponsor: Any legally responsible individual, group, or entity that proposes the establishment of a wetland mitigation bank under the terms of this document.

Unavoidable Impact: An impact for which a practicable alternative cannot be found and which has been minimized to the extent appropriate and practicable.

Values: Wetland processes or attributes that are valuable or beneficial to society.

Wetlands: Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions as based on the *1987 USACE Wetlands Delineation Manual* and an subsequent official clarifications and updates. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetland Type: A description of a wetland as defined by its physical, chemical, or biological properties.

Signatures

Director, Iowa DOT Date

MITIGATION BANKING REVIEW TEAM (MBRT) CONCURRENCE

District Engineer, USACE Date

State Conservationist, NRCS Date

Iowa Administrator, FHWA Date

Director, Iowa DNR Date

Director, Iowa Game and Parks Commission Date

Director, Water, Wetlands, and Pesticides, EPA Date

Regional Director, Fish and Wildlife Service Date

Compiled from:

1. *Nebraska Department of Roads Wetland Mitigation Banking Instrument*
2. *Wetland Mitigation Banking in Iowa*
3. *Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks*