PAST, PRESENT AND FUTURE

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WETLAND MITIGATION

"Look to the ecosystem itself, evaluate its needs based on risk, and then tailor workable solutions to those needs through the participation of stakeholders in every phase of the process"

Carol Browner, Administrator, EPA – comment on recommended approach to implementing wetland mitigation

To protect and enhance the environment, both natural and human, affected by Indiana's transportation system

INDOT's Strategic Goal on the Environment

1 Introduction

1.1 Introductory Notes

"There is no comprehensive law that directly speaks to the protection of the functions and values of this nation's wetlands. Instead we have an odd amalgamation of many laws and regulations that were originally put into effect to address other issues. These laws have been interpreted by federal agencies and developed into federal regulations. It is in this interpretation of the law, by the agencies, that many wetlands have been afforded protection. Until federal or state laws are put into effect, that directly speak to the protection of wetlands, confusion will surround the issue of mitigation and any of the other activities associated with the preservation of the functions and values of all wetlands."[i] (Mitsch and Gosselink, 1993; GAO, 1991)

This report is being written in light of the January 9, 2001 Supreme Court decision regarding the Solid Waste Agency of Northern Cook County vs. United States Army Corps of Engineers. While the effect of the court decision seems to greatly reduce protection of the nations isolated waters under Sections 404 and 401 of the Clean Water Act, it must be recognized that there are other Acts, regulations and executive orders, currently in place, that have the potential to fill the gap in protection left open by this decision.

INDOT has determined that the Department's policy on wetland impacts, and associated mitigation, will remain the same despite the SWANCC decision. INDOT will continue to abide by Executive Order 11990 as well as the Department's inter-agency MOU on wetlands (INDOT, IDNR, USFWS MOU, January 28, 1991). In large, it is through INDOT's desire to satisfy the basic precepts of one of its strategic goals (to protect and enhance the human and natural environment), that the decision to commit to protecting our state's wetland resources was made.[ii]

INDOT will continue to grant protection to wetlands regardless of whether or not a "Section 404 permit" is required. This protection will be meted out and administered utilizing INDOT's current policy on wetland protection as a guideline.[iii]

The Federal Highway Administration (FHWA) has recommended that INDOT forward a listing of those road projects, that are involved with isolated wetlands, to be reviewed by the Army Corps of Engineers (ACOE). The ACOE will make a final determination on whether or not these wetlands are isolated. This will be conducted for the purpose of determining jurisdictional status and the permitting needs.[iv]

At the time of the writing of this report, the Indiana Department of Environmental Management (IDEM), is currently making attempts to determine the role that "Section 401" will play in light of SWANCC. Likewise the INDOT is working with the IDEM in an attempt to determine jurisdictional authority and to develop cooperative approaches and agreements for protecting the quality of the States water resources.[v]

How did mitigation come to be? What is mitigation? What are the laws and regulations that speak to the protection of wetlands through mitigation? How are they implemented? What are the requirements of mitigation? These are a few of the questions that will be addressed in this report.

1.2 Need For Mitigation

IT'S THE LAW !!!!!!!!!!!!

1.2.1 Basis for the Laws

The United States general public's concern regarding water quality was the driving force that led to the development of wetland protection laws and regulations in the early 1970s. In the 1600s over 220 million acres of wetlands were thought to have been in existence in the lower 48 states. There were great losses in wetland acreage during the period of time spanning from the mid 1950s to the mid 1970s. Approximately 458,000 acres/yr were being lost. These losses could mostly be attributed to agricultural impacts to wetlands. By the mid 1980s it was estimated that approximately 103.3 million acres of wetlands were left in the conterminous United States.[vi] It was a period in time when Americans were keenly aware of their diminishing water quality and dwindling wetland resources.

From the mid 1970s to the mid 1980s the estimated rate of wetland loss was 290,000 ac/yr. The estimated rate for the period of time spanning from 1986 to 1997 is down to 58,500 ac/yr. This is an 80% decline in the rate of wetland loss from the previous decade. There are approximately 105.5 million acres of wetlands remaining in the conterminous United States.[vii]

Twenty-two states have lost at least 50% of their wetlands. Seven states, including Indiana, have lost more than 80% of their wetlands. As of 1993 Indiana was reported to have lost 87% of its wetlands.[viii]

Whereas in the 1950s to the 1980s the human activity that posed the greatest threat to wetlands was agriculture (US EPA 1994), today the top human activities that pose threats to wetlands are: Urban Development (30%), Agricultrue (26%), Silviculture (23%), and Rural Development (21%) (Dahl 2000). The primary pollutants resulting in wetland degradation are: Sediment, Nutrients, Pesticides, Salinity, Heavy Metals, Weeds, Low Dissolved Oxygen, pH and Selenium (US EPA, 1994).

Laws and regulations were put into effect in the early 1970s in order to address the needs outlined in this section. The laws were to effectively preserve the functional capacities of our nation's wetlands and thus curtail the degradation of our nation's water quality.

1.3 Purpose of Mitigation

To maintain the chemical, physical and biological integrity of this nation's waters including wetlands.[ix]

2 The Laws

"Laws are like sausages, it is better not to see them being made."

-Otto von Bismark

2.1 1973 Endangered Species Act

Afforded protection to federally threatened and endangered species. Some early attempts at wetland mitigation were likely made in order to compensate for habitat destruction of federally endangered - water dependent species

2.2 Executive Order 11990 – May 24, 1977

The goal of this order was to direct federal agencies to avoid, to the maximum extent possible, the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of construction in new wetlands wherever there is a practicable alternative.

The order states that to the extent provided by law, agencies shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds 1) that there is no practicable alternative, 2) the proposed action includes all practicable measures to minimize harm to wetlands. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.

The order is worded in much the same fashion as the 1990 MOA between the EPA and the DOA. The difference in this order from the MOA is that the heads of the agencies double as both the administrators and enforcers. Also a point of difference is that in the order there is no permit involvement. Enforcement is implemented through the denial of federal aid to agencies that do not carry out the provisions of the order.

2.3 1985 Food Security Act

This act was aimed in filling a gap in wetland protection that was left open in section 404 of the Clean Water Act. Section 404 exempted some activities from regulations governing dredge and fill activities. Farmland was one of the activities exempted from EPA/DOA oversight.

The 1985 FSA laid down provisions that producers converting wetlands after December 23, 1985 would no longer be eligible for commodity price supports, loans, crop insurance, disaster payments and storage permits. Mitigation was allowed for those conversions that had occurred after the December 23 date.

2.4 1989 North American Wetlands Conservation Act

Increased protection and restoration of wetlands under the North American Waterfowl Management Plan. Funded in part by taxes on hunting equipment and by hunting fines.

2.5 1990 Food Agriculture, Conservation and Trade Act

Established Wetlands Reserve Program (WRP) and Conservation Reserve Program (CRP)

2.5.1 Conservation Reserve Program

The focus of the Conservation Reserve Program (CRP) was to encourage farmers to take highly erodible lands out of production for ten years. While most CRP monies went to protection of highly erodible upland areas, the CRP also provided funds to restore previously cropped wetlands, floodplains, and riparian areas adjacent to streams (WMI 1994; NGPC 1995a).

2.5.2 Wetland Reserve Program

The WRP is a voluntary incentive program, created in the 1990 Farm Bill, to encourage wetland restoration and protection in agricultural areas. The WRP authorizes purchases of easements containing wetlands from participating landowners and cost-share payments for wetland restoration.

2.6 Indiana Flood Control Act

Indiana Code, IC 14-28-1

This act gives the Indiana Department of Natural Resources the authority to grant or deny permits for construction in floodways. The act indirectly controls activities that could have a detrimental effect on wetlands that are found within the 100 year floodplain of a jurisdictional waterway. The pertinent section of this act [14-28-22 (e) (3)] states "the IDNR shall issue a permit only if it can be clearly proven that the structure, obstruction, deposit or excavation will not, result in unreasonably detrimental effects upon fish, wildlife, or botanical resources." Section [14-28-22 (f)] goes on to state that "in deciding whether to issue a permit under this section, the IDNR shall consider the cumulative effect of the structure, obstruction, deposit, or excavation. The director may incorporate in and make a part of an order of authorization conditions and restrictions that the director considers necessary for the purposes of this chapter."

2.7 1990 Water Resources Development Act

Required federal agencies to develop action plan to achieve no-net loss of wetlands. In attaining this goal, agencies may require mitigation.

2.8 1899 Rivers and Harbors Act (Section 10 Permit)

Approval by the Secretary of the Army Corps of Engineers for all construction activities in, and deposition of refuse into, navigable waters.

2.9 Federal Water Pollution Control Act Amendments 1972 [Clean Water Act (CWA)]

2.9.1 Section 404 of the CWA

US Code: Title 33, Section 1344 of the Clean Water Act

- Authorized the Secretary of the Army Corps of Engineers to issue permits for the discharge of dredged or fill material into navigable waters.
- Gave the DOA the capacity to grant to the State's the authority to issue permits under the State. program (Section 401 Water Quality Certification). This issuance of authority has the effect of transferring enforcement authority, from the DOA, to the State for the control over discharge: approvals and notifications.
- Section 404 has no control over ground water pumping that can completely de-water a wetland (USEPA, 1989). As a result, by most estimates, only about 20% of the activities that destroy wetlands are regulated under the Section 404 program [US General Accounting Office (GAO), 1991].

2.9.2 Definition of Waters of the United States

US Code: Title 33 CFR Section 328.3 (a) (3)
Provides a regulatory interpretation of the meaning of Navigable Waters. This definition includes "Waters of the U.S." "Waters of the U.S" is defined to include waters that can be used or were used for interstate or foreign commerce. This definition includes those wetlands that are deemed as susceptible to playing a role in interstate commerce. The definition also includes interstate wetlands.

2.9.3 1980 404 (b) (1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material

40 CFR Part 230 section 404 (b) (1)

2.9.3.1 Compliance

- Places restrictions on discharge
- Established findings of compliance or non-compliance in regard to the restrictions on discharge

2.9.3.2 Established Potential Impacts on Special Aquatic Sites

- establishes possible loss of values to be considered in making factual determinations on the findings of compliance or non-compliance

2.9.3.3 Actions to Minimize Adverse Effects

2.9.4 1990 MOA between the EPA and the DOA concerning the determination of mitigation under the CWA 404 (b) (1) Guidelines

- Established the purpose of mitigatigation. It expresses the explicit intent of the Army and EPA to implement the objective of the CWA to restore and maintain the chemical, physical and biological integrity of the Nation's waters, including wetlands.
- Incorporates the goal of "no net loss". The MOA adds that there shall be no net loss of functions or values
- Established "**Sequencing**" – sequencing is a hierarchical ordering of actions to be taken in order to maintain the chemical, physical and biological integrity of "waters of the U.S."

2.9.4.1 Sequencing Hierarchy

2.9.4.1.1 Avoidance – Preferred Action

Allows permit issuance for the least environmentally damaging practicable alternative

Practicable – *"means available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes"*

2.9.4.1.2 Minimization –Only if avoidance is not practicable

States that appropriate and practicable steps to minimize the adverse impacts will be required through project modifications and permit conditions.

2.9.4.1.3 Compensatory Mitigation – "Last Resort" Action

Is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been carried out.

2.9.4.1.4 Sequencing of Compensatory Mitigation

- onsite-in areas contiguous or adjacent to the discharge site (preferred)
- offsite – in the same geographic area (watershed) if practicable

2.9.4.1.4.1 In-Kind Functional Replacement

In-kind replacement is greatly preferred over out-of-kind replacement

2.9.4.1.4.2 Restoration is favored over Creation

Restoration – means restoring an area, that is currently not wetland, back to its native wetland condition

Creation – means creating a wetland from an area that is, and historically has been, upland

2.9.4.1.4.3 Mitigation Banking

A form of compensatory mitigation allowed under the EPA/DOA 1990 MOA

2.9.4.2 Establishes Wetland Monitoring Option

Wetland Monitoring is a means of determining whether or not the conditions of a DOA Section 404 permit have been complied with and whether the purpose intended to be served by the condition is actually achieved. If at any time the DOA determines that the mitigation site is not in compliance with the permit the Corps will take action in accordance with 33 CFR Part 326 (Supervision of Authorized Activities). Remedial action may be required.

2.10 State Water Quality Certification (Section 401)

CWA Title 33 section 1374.1

Any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters shall provide the licensing or permitting agency a certification from the State in which the discharge originates.

On the Indiana Department of Environmental Management's (IDEM) internet homepage it is stated that, "Any person who wishes to place fill materials, excavate or dredge, or mechanically clear (use heavy equipment) within a wetland, lake, river, or stream must first apply to the Corps of Engineers for a Section 404 permit. If the Corps of Engineers decides a permit is needed, then the person must obtain a Section 401 Water Quality Certification from the state. The state reviews the proposed activity to determine if it will comply with Indiana's water quality standards. The state will require the applicant to avoid impacts, minimize impacts, and provide compensatory mitigation for adverse impacts to wetlands and other waters. The state will deny water quality certification if the activity will cause adverse impacts to water quality, such as cases where the preceding steps are not followed or cases where compensatory mitigation cannot offset adverse impacts to water quality".[X]

Refer to Section 2.7 [Section 404(h) CWA] of this report for a description of the mechanism within the CWA that allows the state to implement the 404 process at the state level, regardless of the need for a federal permit. State enforcement can be granted when that State has demonstrated to the DOA and EPA the ability to carry out the provisions of section 404 as stipulated in section 404 (h) (i), (ii), and (iii).

3 Implementation of the Sequencing Process (Mitigation)

Sequencing is defined under section 2.7.3 of this report

Plan, construct, and operate Indiana's transportation system to minimize the effects on the environment

INDOT's Strategic Objectives for the Environment

3.1 Avoidance/Minimization Techniques

By law, avoidance must be the first mitigation alternative considered.

The definition of mitigation as used in the CWA, was borrowed from that definition provided in the National Environmental Policy Act of 1969. In the NEPA definition it is stated that mitigation includes a) Avoiding the impact altogether by not taking a certain action or parts of an action. b) Minimizing impacts by limiting the degree of magnitude of the action and its implementation. c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. e) Compensating for the impact by replacing or providing substitute resources or environments.

As is required by law, an applicant for a 404 permit must demonstrate that there is no practicable alternative to a proposed fill activity. Avoidance must be considered at all stages of transportation development from Planning stage through the project development phase all the way to the construction phase.

"**Avoidance should always be INDOT's first choice of mitigation techniques to utilize when that choice is considered reasonable. Only after it is found that it is not reasonable should minimization and compensatory mitigation be considered.**"[xi]

3.1.1 Needs Assessment[xii]

- consider whether the project is truly needed
- consider whether the project scope can be modified, while still meeting worthwhile objectives
- consider whether to build on a new alignment versus improving the existing highway

3.1.2 Choice of Corridor/Alignment[xiii]

- Evaluate alternative corridors that will not have temporary or permanent impacts on wetlands
- Consider whether the project needs can be addressed by modifying an existing alignment (such as by adding turn lanes)

3.1.3 Modification of Project Design Components[xiv]

- Adjust the project termini, by shortening or shifting the project longitudinally.
- Shift part of the alignment to avoid or minimize impacts
- Use a split alignment to leave a wetland within a broad median
- Steepen the slopes of cut or fill sections to the maximum allowed under the standards. This may require the use of guardrails.
- Reduce the width of the typical section to the minimum allowed under applicable standards in conformance with the project purpose
- Consider the use of retaining walls
- Consider using a bridge where wetlands are especially sensitive
- As a last resort, consider requesting an exception to federal or other standards for pavement/shoulder width or sideslopes.
- end to end bridge construction
- top down bridge construction

3.1.4 Construction Practices[xv]

- Locate staging areas and spoil disposal areas away from wetlands
- Take care that temporary impacts are not so severe that they result in permanent impacts (ex. over-compaction of a wetland area by heavy machinery)

The DOA and IDEM through the issuance of 404 and 401 permits/certifications control temporary Impacts and the conditions spelled out in those permits/certifications.

3.2 Compensatory Mitigation-the least desirable option

"Regulatory programs are typically vulnerable to economic arguments for allowing development of wetlands, and often rely on the safety net of mitigation to offset wetland losses or degradation. Yet the technology and reliability of wetland mitigation lags well behind the expectations placed on it."[xvi]

North Carolina State University, Water Quality Group

Compensatory mitigation is the least desirable of the three mitigation sequencing options. It is a risky endeavor, at best, and should only be undertaken by a team of qualified professionals. This team should ideally be composed of individuals who have an expertise in areas such as:

- wetland project management
- terrestrial ecology
- surface and groundwater hydrology
- geology and chemistry
- soils
- highway engineering and design
- landscape design
- construction methods and management
- real estate appraisal and negotiation

Kusler and Kentula 1990 status report on wetland creation and restoration indicates that, "success (compensatory mitigation success) relates directly to the actual experience by practitioners"[xvii] The report goes on to say that compensatory mitigation should be viewed as an experiment. Experience has shown that many of the compensatory mitigation sites require remedial work or manipulation (experimentation) of some sort in order to attain success. Remedial work should be expected to be the norm for compensatory mitigation sites and planned for in advance.

Success of a wetland mitigation site can be broken down by the class or type of wetland you are trying to make.

3.2.1 Compensatory Mitigation - Project Development Process - Timetable

"Time is money" - *Benjamin Franklin, Advice to a Young Tradesman*

The following Procedures were taken from the INDOT Consultant Services Bulletin #97-3, dated September 1997 - Guide to Wetland Mitigation Issues for Transportation Engineers, AASHTO, September 1996)

3.2.1.1 Determination of Need for Mitigation

3.2.1.1.1 Base Wetlands Determination Report on Preliminary Engineering Report
3.2.1.1.2 >0.10 acre impact then Compensatory Mitigation is Required
3.2.1.1.3 Implementation of sequencing

3.2.1.2 Compensatory Mitigation

3.2.1.2.1 Assign Des.# and Kin#

Schedules should be developed for all mitigation projects. At times the mitigation may be made a project unto itself.

3.2.1.3 Determine mitigation needs

The acreage of replacement mitigation needed to offset the effects of the proposed fill activity. The determination of acreage needed is based on provisions as outlined in INDOT's MOU with various resource agencies

3.2.1.3.1 MOU ratios

January 28, 1991 INDOT entered into an agreement with the IDNR and the USFWS in which ratios were established for four different classes of plant cover

3.2.1.3.1.1 Vegetation Class Impacted and Replacement Ratio

farmed wetland – 1:1
shrub/scrub wetland – 2-3:1 depending on quality of impact site
hardwood forest – 3-4:1 depending on quality
exceptional or unique wetlands – 4 and above:1 -depending on quality.

3.2.1.3.1.2 Quality

The quality of the wetland is based upon its ecological value and the degree to which it is pristine. The more degraded the site the lower the quality.

3.2.1.3.2 Increase Acreage required by 25%

This additional acreage

3.2.1.4 Notification Memo to Divisions

- Project Coordinator
- Land Acquisition
- Design

3.2.1.5 Assignment of Design

The person assigned to carry out the wetland mitigation site development process is known as the Wetland Designer

3.2.1.5.1 EA – Assigned

- in house
- outsourced –

EA can assign projects as open ended contract or as entirely independent new contracts.

3.2.1.5.2 Design Assigned

3.2.1.5.2.1 Consultant

If it is given to the consultant performing the road contract, the wetland design is usually subcontracted out to a design consultant specializing in the design of compensatory mitigation sites.

3.2.1.5.2.2 Landscape section

3.2.1.6 Establish Needs

This is not a comprehensive list!

1. OPTIONAL "Watershed Needs Assessment" should be carried out through coordination with pertinent resource agencies. The purpose of this assessment is to identify issues of concern at the regional and local watershed levels. The process fosters a cooperative relationship with the agencies, improves the chances of mitigation success.
2. MANDATORY* Ideally there should be in-kind replacement of the functions and values exhibited by the wetland targeted to be filled (this may conflict with #1). Given the inadequacy of funding, technologies and construction techniques, developers have commonly had to lower their expectations for being able to carry out "ideal" or functional replacement. The current approach, for compensatory mitigation, is that of functional replacement but that goal is rarely achieved. . All practicable measures should be taken to try to attain functional replacement. Typically what is practicable to expect from compensatory mitigation at this time is:
   - in-kind replacement of hydroregime
   - in-kind replacement of vegetational class.
   - attainment of minimum survivorship goals

If a developer can truly meet these needs, and prove that he has met them, in all likelihood he will have achieved "success" in the eyes of the DOA COE and the IDEM [if all other conditions, as listed in this section, (3.2.1.6)] are met

3. MANDATORY* Target acreage requirements as dictated by mitigation ratios + 25%
4. MANDATORY Incorporate US Fish and Wildlife Service goals into the overall mitigation site goals as long as those goals are practicable
5. MANDATORY Must comply with "other" federal and state laws and regulations, Archaeology, Construction in a Floodway
6. MANDATORY Must allow access for monitoring activities
7. MANDATORY Must become a self sustaining system
8. MANDATORY Must meet minimum state and local regulations for engineering and design (ex. dike construction, emergency spillway design, water control structure design, hydraulic adequacy, erosion control etc).
9. MANDATORY No adverse affect on adjacent landowners property rights
10. OPTIONAL Hydroregime diversification
11. OPTIONAL Habitat for specific state endangered and threatened species
12. OPTIONAL Diversification of vegetational class
13. OPTIONAL Water Quality improvements over that which is required. Recognize "moments of opportunity"

- Those needs specified as being mandatory are not always "set in stone". Corps Project Managers are given discretion to change these requirements if it is found that the changes will promote the attainment of the goals as those goals are stated in the 1990 MOA between the EPA and the DOA

3.2.1.7 Goals

Set goals based on the needs as stated in section 3.2.1.6 of this report.

3.2.1.8 List Target Site Characteristics

Generate a list of required site characteristics needed to meet the goals identified in section 3.2.1.7 of this report. This information should be used in screening potential mitigation sites in the site

selection process and in site design. Identify target plant species, target morphology, target water source, watershed size (see the methods section of Marble's Functional Design[xviii]).

3.2.1.9 Site Selection

This consists of what is usually a cursory inspection, unless one is investigating bank locations. The intensive investigations are usually reserved for the preferred alternative. The Wetland Designer should coordinate with the resource agencies and various individuals and organizations after having established needs in order to obtain their aid in finding suitable sites.

The Wetland Designer identifies potential mitigation sites using the following criteria:

not a complete listing

1. Water Supply and Dependability - Identification of water source, site morphology. Thoroughly investigate watershed area to determine the watershed to mitigation site ratio. Other potential sources of hydrology such as groundwater and overbank flow should also be identified. Check to find out if the water source is of the correct type to address functional needs.
2. Landowner willingness to sell – coordinate with Land Acquisition. Check potential sellers lists and landlocked property, Shirley Heinze Fund etc.
3. Land Costs – Get Preliminary Cost Estimate
4. Topographic Relief – i.e. Estimated Earthwork – the flatter the ground the less earthwork
5. Adequacy of Soils
6. Geologic Conditions (shaley substrate may require sealing) Check geological maps
7. Proximity to Project Site
8. Proximity to state road or highway
9. Access – coordinate with landowners
10. Avoidance of areas that contain noxious species (defined under the Federal Noxious Weed Act, 1974 - 7 *USC 150aa it seq.*) or invasive species (as defined under Executive order 13112) or areas that are near or adjacent to the proposed mitigation site containing these species.
11. Avoidance of areas that could be needed for future development activity (ex. added travel lanes, zoned areas) – Check with zoning boards, local and county and state planning officials
12. Compatibility with adjacent existing land uses (ex. legal drains, housing, watershed projects,
13. State or federal environmental protection laws (ex. protected archaeological sites, endangered species habitat, rural historic landscapes)
14. Avoidance of contaminated areas or grounds housing USTs.
15. Avoidance of areas requiring intensive NEPA documentation
16. Gap Analysis – can be used to gauge ecological value due to positioning. Consult with USFWS and DNR biologists
17. Estimated Cost of Materials
18. Estimated Time to Obtain Regulatory Agency Approval – Based on the attractiveness of the site.
19. Geomorphic Analysis- can be used to gauge probability of achieving success.
20. Identification of banking or in-lieu fee opportunities – only if onsite mitigation is not an option
21. Presence of required characteristics needed to meet goals (see section 3.2.1.8 of this report)

*Coordination activity, with pertinent parties, should be undertaken as part of site selection

3.2.1.10 Ranking of Potential Compensatory Mitigation Sites

All potential mitigation sites should be analyzed one to the other in a side by side comparison in order to assess the sites assets and liabilities. Each of the criteria, by which a site, will be rated should be weighted and assigned a value in accordance with the importance of that characteristic relative to all of the criteria analyzed in the study. In this fashion potential mitigation sites can be assigned a score that is based on the degree to which that site satisfies the criteria, relative to the

degree to which that same criteria is satisfied at all of the sites under consideration. A grand total can be assigned to each of the sites by tallying up the criteria scores for each of the potential mitigation sites. The site with the highest score (or lowest score depending on how you set it up) would be designated the preferred site.

3.2.1.11 Preliminary Field Meeting

This meeting gives the regulatory and resource agencies a chance to see the preferred site. The main goal of this meeting is to obtain regulatory agency approval of the site location. This approval should be obtained from the agencies in document form. This documentation does not absolve the regulatory agencies' responsibility to ensure the success of the site through enforcement action.

3.2.1.12 Data Collection

3.2.1.12.1 Wetland Compensatory Mitigation Team is Assigned

The Wetland Designer takes on the role of mitigation project manager the other members of the team are: Hydrologic Engineer, Landscape Architect/Designer, Highway Designer, and CAD technician. The mitigation manager can consult with the other team members on an as needed basis. It is wise to have frequent and intensive consultation with team members on projects where there are many unknowns or where the project is expected to be inordinately expensive.

3.2.1.12.2 Information Gathering

The mitigation project designer undertakes this activity. At this point it is appropriate to obtain technical assistance. Typical information to be gathered at this stage in mitigation site development includes:

1. Topographic and Boundary Survey - set benchmarks (if being used) - have the surveyor set a reference spike identifying its elevation – request other pertinent info be included.
2. Soil Borings and Geology (customized for wetland investigations ex. infiltration rates/percolation tests)
3. Drainage Layout – locate tiles and coordinate with the County Surveyor and or Drainage Board
4. Hydrology Field Data Gathering. The hydraulic engineer should identify the potential water source. This can usually be determined by landscape positioning and site morphology (see table on page 13). Once the water source is identified the hydraulic engineer can decide on what data collection methods should be utilized at the site. This data will be used in creating a water balance where monthly hydroperiods can be predicted.

The runoff calculations for the flats morphological type (see table on page 13) are used in a water balance. A water balance can be defined, in part, by its goal, the goal being the determination of appropriate site contours for the compensatory mitigation site. Appropriate site contours are those contours within the compensatory mitigation site that lend themselves to the establishment of a hydroperiod that is conducive to the formation of the target vegetative class. Hydroperiod refers to the variation in wetland water level with time. The hydroperiod places limits on the type of vegetation that can become established at a site (plant water tolerance), thus the hydroperiod determines the vegetational class.

Use of the water balance in compensatory mitigation design requires that one perform the balance for varying morphologic and storage scenarios. The inflows to the site are fixed; that is to say we have no control over them. The outflow is composed of both fixed and variable components. The fixed component of outflow contains such losses as evapotransporation and soil infiltration. The variable portion of the outflow component (at least in regard to compensatory mitigation) is site water storage and morphology. It is site storage and morphology that is within the wetland designers control and it is all the control that one needs to create hydrologic conditions that are favorable to achieving vegetative and functional compensatory mitigation success.

Recognized Morphologies			
MORPHOLOGY	**H2O SOURCE**	**Hydrodynamics**	**Data Collection Method**
Depressional	return flow from groundwater	vertical	nested piezometers and monitoring wells – determine frequency and duration of inundation – generate hydrographs
Lacustrine Fringe	overbank flow from lake	bi-directional and horizontal	Benchmarking method, staff gauge recorder and monitoring wells – determine frequency and duration of flooding – generate hydrographs
Tidal Fringe	overbank flow	bi-directional and horizontal	N/A in Indiana
Slope	return flow from groundwater	unidirectional and horizontal	Design of this type of wetland is rarely attempted
Riverine	overbank flow from channel	unidirectional and horizontal	Benchmarking method, staff gauge recorder, USGS gauge data, monitoring wells – determine frequency and duration of flooding
Mineral Soil Flats	precipitation surface flow	vertical	drainage basin runoff calculations – or use Benchmarking method
Organic Soil Flats	precipitation surface flow	vertical	drainage basin runoff calculations or use Benchmarking method

5. Hydrology-Estimated Evapotransporation
6. List of Recommended Plantings – An investigation should be conducted by the landscape architect to develop a preliminary list of species that would be appropriate for anticipated site conditions and for meeting identified project goals. The following is a list of some of the things to consider when choosing species
   - Target hydroregime and plant water tolerances (refer to NCHRP Report #379)
   - Species availability
   - Cost of the species
   - Target vegetation class (as listed in goals)
   - Class diversity (if possible and if it does not conflict with project goals)
   - Consider Resource Agency recommendations
   - Threatened or endangered species needs
   - Water source (ex. if the groundwater is high in calcium consider using calcophiles)
   - Expected pollutant levels in the water
   - Species competition
7. Pertinent Current and Historical Meteorological Data
8. Biological Investigation
9. Contractual "Option to Buy" with the landowner
10. NEPA Documentation including archaeological investigation

3.2.1.13 Recommended Design Techniques for Compensatory Mitigation

3.2.1.14 Technical Assistance

- NRCS
- USGS
- USACOE
- EPA
- NOAA
- Forest Service

- State and Federal Fish and Wildlife Agencies (DNR, USFWS)
- State Water Quality Agency
- Universities
- Ducks Unlimited, Izak Walton League, Audubon and other NGOs
- Wetland Societies and other Professional Organizations and Associations
- Wetland Managers
- Local Groups and Organizations
- Not for Profit Environmental Organizations
- Nurseries
- Books, reports, papers, professional journals, internet

3.2.1.15 Transfer of Spatial Data into CAD

The Wetland designer, the Road designer and the CAD technician should each receive one copy of the CAD survey information from the project coordinator. Both an electronic copy and a hard copy should be provided to the Wetland designer.

3.2.1.16 Design Techniques

The wetland designer, in coordination with, the Hydraulic Engineer, will develop preliminary contours. The watersource present at the site will dictate the design method to be utilized. The three watersources commonly most frequently found in Indiana are listed below:

3.2.1.16.1 Overbank Flow

3.2.1.16.1.1 Benchmarking Method -

Site modeling is used at an identified and appropriate reference site near the proposed mitigation site. The plant community composition, at the reference site, is studied comparing plant indicator status with topographic positioning. Inferences as to the hydroregime present at certain elevations are made based on the indicator status of the plants at the site. Contours for the proposed compensatory mitigation site are developed in such a fashion that they mimic the contours of the desired hydroregime as identified at the reference site

3.2.1.16.1.2 Stage or Monitoring/Piezometer Data

Stage data is used to develop a hydrograph. The disadvantage of this approach is that unless the study has taken place over a long period of time (10 years) the data will not accurately reflect the long term frequency and duration of flooding at the site.

3.2.1.16.1.3 USGS Historic Gage Data

The current and historical information available from the USGS permanent gauging stations can be used in the development of hydrographs. The hydrographs can be used to predict the long term frequencies and durations of inundation. Mitigation site contours can be manipulated to increase or decrease the frequencies and durations in order to attain the desired hydroperiod.

3.2.1.16.2 Groundwater

3.2.1.16.2.1 Monitoring/Piezometer Wells

The information from these devices can be used to get information on groundwater fluctuations. Typically there is not enough time for developers to accrue long term data from these instruments thus the long term fluctuations in groundwater are hard to predict. Hydrographs can be developed from the data collected by these devices. Site contours can be manipulated to intersect the water table at desired levels in order to create target hydroperiods.

3.2.1.16.2.2 Benchmarking Method

This is essentially the same method as described under section 3.2.2.3.1.1 of this report. The designer can rely, not only on plant indicator status but also, on primary and secondary indicators of water fluctuations at the reference site in order to assess water fluctuations.

3.2.1.16.3 Precipitation/Surface Flow

3.2.1.16.3.1 Water Balance Method

A water balance is performed for a model site. The balance is calculated for each month of a three year of modeling period. To perform the water balance one simply adds the beginning of the month model site water storage (Sc) to the sum of the site inflows (Si) minus the sum of the site outflows (So) this will give you the end of month storage (Se). This can be stated in an equation that looks like Sc + (Si - So) = Se. As an example, imagine that you have a newly constructed compensatory mitigation site, first you would calculate the Se for the first month of the growing season. You find that it is zero (this is typical for newly constructed mitigation sites). The Se for that first month is then carried into the next month and the Se for that month is calculated using the same equation. The inflows will have to be recalculated for each month using historical averages for precipitation (this information can be obtained in climatography reports from NOAA). Likewise, the outflows will also need to be recalculated for each month of the year. This recalculation is required due to the effects of changing temperatures on evapotranspiration rates. This water balance "program" should be cycled through the months until the end of the third year when the model site should have reached normal water levels.

The end of month storage, for each of the months in the third modeling year, can be expressed in cubic feet of water. This information can then be entered into CAD where the area inundated, the depth of inundation and the elevation of inundation, can be expressed for any point within the model site. From this information hydrographs can be generated that show water level elevations in relation to ground level elevations. The hydrograph can then be analyzed to determine the frequency and duration of inundation these should be expressed in terms of a percentage of the growing season. This information can be used to identify the hydroperiod (ex. 12.5% of the growing season = temporarily flooded). If the hydroregime is not of that desired the water balance should be performed again utilizing a different initial model storage capacity. This is an iterative process that should be performed until the desired results are satisfied.

3.2.1.16.3.1.1 NOTES

- The USDA NRCS Watershed Runoff Program – TR-55 can be used to estimate watershed runoff. The TR-55 can also be used to determine water control structure selection and sizing through calculation of time of concentration.

- The geological, morphological and vegetation characteristics of the watershed can be highly variable and difficult to accurately assess without intensive and costly field and laboratory investigations. Without such detail it becomes difficult to accurately model the compensatory mitigation site.

- Water level control structures should be used for sites with a Precipitation/Surface Runoff watersource, at least until the plants within the site have become durable enough to cope with the sometimes drastic changes of natural water table fluctuations. When the plants within the site do reach this point of maturity, then the outlet control should be locked into a fixed position and be upgraded to become a permanent feature.

- Detailed soil percolation tests and various other soil studies should be conducted in order to allow accurate prediction of infiltration rates for the site, otherwise the model will not be accurate. The soil study should take into account the following factors:

  Topsoil percolation rates – analyze topsoil to be used

  Depth to groundwater

  Subsoil percolation rates- take into consideration compaction from construction

  Affect of any planned soil deconsolidation (disking, plowing, ripping) on percolation rates

- Water Balances are time consuming to undertake due to the complexity, the data needs and the programs iterative nature.

3.2.1.17 The Road Designer develops Final Contours, Final Grading Plan, Cross Sections and Earthwork Quantities

The final design for the site should be made to meet INDOT Design standards for readability and constructability. It is recommended that this phase of project development be implemented in consultation with the wetland designer, hydraulic engineer and landscape architect. Begin work on writing special provisions.

3.2.1.18 Land Acquisition Begins

3.2.1.19 Road Designer Develops Soil Erosion Control Plan

3.2.1.20 Wetland Designer writes Wetland Mitigation/Monitoring Plan

The mitigation/monitoring plan is one component of the DOA 404 and IDEM 401 permits. It is only required for projects where fill in jurisdictional wetlands will occur.

3.2.1.21 Regulatory Approval Sought

If the mitigation site is to be constructed in a "floodway" an IDNR Construction in a Floodway Permit may be required. There is a Wetland Restoration Project Exemption allowed under 310 IAC 6-1-15. Those wetland restoration projects that meet the criteria as stated in that section.

3.2.1.22 Land Acquisition Complete

3.2.1.23 Contract is Let

3.2.1.24 Wetland Site is Constructed

3.2.1.25 Wetland Monitoring is Initiated

3.2.1.26 Remedial Work

Some sites will require remedial work (ex. herbicide treatment, regrading, replanting etc) in order to receive Corps final approval. Read the DOA Corps permit conditions and IDEM permit conditions to determine what standards the site will be held to.

3.2.1.27 Corps Determination of Final Approval

3.2.2 Construction Phase

If possible the mitigation site sponsor should stipulate that the prime contractor (or a sub) either specialize in, or have had a good amount of background experience in, the construction of successful wetland mitigation sites.

After selection of a contractor, the wetland designer should receive notification of the pre-construction conference. It is important to the success of the mitigation project that coordination between the contractor, the area engineer, and the project engineer be allowed an opportunity to meet prior to the initiation of construction activities. Unlike road construction, many contractors are not familiar with wetland design and construction or the intent and goals of the construction. In a like fashion many wetland designers are not familiar with construction capabilities and limitations. It is imperative that these parties have an opportunity to ask questions, provide answers and identify any problems up-front.

At this meeting the wetland designer should reiterate the critical components of the project, likewise any questions or concerns the contractor might have should be brought up at this time. Other topics of interest that could be brought up at this meeting include:

- logistics and timing
- what equipment to use
- how to handle difficult subsurface conditions
- dewatering
- compaction
- no work areas
- hauling spoil
- spoil disposal sites
- special construction techniques
- Acceptable tolerances in final grading
- construction timetable

With most "wetland" permits it is specified that construction of the mitigation site must be completed prior to the filling of any wetlands. This requirement is typically stated in the DOA 404 permit or the IDEM 401 Water Quality permit. For INDOT this means that the construction of the mitigation site should be completed before construction of the road project is initiated. This stipulation should be provided in the list of special provisions that accompany the contract. If this statement does not appear in the contract it may have been an omission during design development.

The project engineer should be familiar with the stipulations of the 404 and 401 permits. Where the project is tied to Construction in a Floodway Permit, the engineer would need to become familiar with the conditions listed in that permit as well. The information contained in these documents will aid in understanding the does and don'ts of various activities associated with wetland construction as well as other mitigation requirements.

It is recommended that the contractor keep close contact with the wetland designer during key phases of the construction process. Likewise the wetland designer should make periodic field checks of the site in order to assess its conformity with design intent.

3.2.3 Types of Compensatory Mitigation

Authority: 1990 MOA between the EPA and the DOA[xix]

3.2.3.1 Wetland Restoration

The preferred method

Wetland restoration is the act of taking an area that was, at some point in the past, a wetland and reintroducing into that site those characteristics that are needed to restore it to its native wetland condition. Wetland restoration is the preferred method of compensatory mitigation. Restoration sites have the highest success rates of all the compensatory mitigation options. The DOA Corps and IDEM typically look more favorably on the restoration option than they do creation or enhancement and thus are more likely to expedite those permits that utilize this form of compensatory mitigation.

3.2.3.2 Wetland Enhancement

Wetland enhancement is the act of taking an existing wetland area that is in a degraded state and augmenting the site in such a fashion as to improve the quality and function of the wetland. Enhancement can include activities such as: planting, improvements to water quality, overall improvements to the physical, biological and chemical components of the site. Wetland enhancement does not contribute to the "no net loss" goal and thus is not looked favorably upon by IDEM or the DOA ACOE. It is typically used in "moment of opportunity" situations.

3.2.3.3 Wetland Creation

Wetland creation is the act of making a wetland out of an area that is currently, and was historically, upland. This type of mitigation is usually the most expensive type of compensatory mitigation because it usually requires a large amount of earthmoving and engineering. Studies have shown this to be the least effective form of compensatory mitigation.[xx] It is typically the least successful of all the forms of mitigation. Invasive and exotic species are more likely to colonize these disturbed sites. For these reasons the DOA ACOE and the IDEM do not look favorably on this type of compensatory mitigation but are more likely to approve a project with this form of mitigation than enhancement because creation does contribute to the goal of "no net loss".

3.2.4 Compensatory Mitigation Methods

Wetland restoration and wetland creation can be undertaken using one of four methods. These methods are listed below.

3.2.4.1 Onsite Compensatory Mitigation **The preferred method**

3.2.4.1.1 Authority

1990 MOA between the EPA and DOA Concerning 404 (b) (1) Guidelines (1990 MOA EPA/DOA)

3.2.4.1.2 What is it

Onsite mitigation is mitigation that occurs adjacent or within close proximity to the area of wetland impact. At its broadest, onsite mitigation can occur anywhere within the local watershed. The closer the mitigation site is to the area of project impact the more favorably it is looked upon by the regulatory agencies and in turn the more likely that the permits will be approved.

Compensatory mitigation can become expensive. Much of the expense can is directly related to the area in which the mitigation is carried out. In portions of Lake County, where much of the land is developed, land acquisition costs have been known to run as high as $50,000.00 an acre. The Indianapolis Star reported that the typical cost for wetland mitigation within the state of Indiana is $24,000.00 per acre. INDOT currently has a project in Warrick County that is 28 acres in size and that INDOT's engineers estimated would cost approximately $40,000.00 per acre just for land acquisition and construction costs. This figure does not include costs for design and other preliminary studies leading up to design. The project was awarded to a bidder for approximately half of the projected cost.

3.2.4.1.3 Implementation Measures

Attempt to find a site within the parameters described in the previous section. This should be undertaken when in the Site Selection Phase of Project development as described in section 3.2.1.10 of this report.

3.2.4.1.4 Status of Method

This form of mitigation is commonly performed on INDOT projects. Personal experience has shown that the regulatory agencies do tend to show some leniency when trying to perform on-site replacement and have at times allowed INDOT to go outside of the local watershed in order to find a site. If the mitigation site is to be outside of the local watershed a higher mitigation ratio is typically imposed.

3.2.4.2 Consolidation

3.2.4.2.1 Authority

Indirectly alluded to within the 1990 MOA EPA/DOA

3.2.4.2.2 What is it?

This is a form of mitigation that is not formally recognized by any of the regulatory agencies. But it has been used by INDOT successfully in the past. Consolidation is the act of carrying out mitigation for several sites at one mitigation site. The mitigation site is constructed for projects with impacts that are within the same local watershed (loosely interpreted as on-site mitigation). The consolidation must be approved by the regulatory agencies prior to design development activity.

3.2.4.2.3 Implementation Measures

Early coordination with the regulatory agencies is required. Have these agencies involved in the site selection process. Seek approval from the resource agencies before final site selection. Negotiations and compromises are to be expected in this process. Mitigation replacement ratios might be increased if the consolidation site is not immediately adjacent to or within the local watershed where the fill activity will take place. Carefully document all agreements and arrangements reached during coordination with these agencies.

3.2.4.2.4 Status of Method

The method of mitigation is not formally recognized by any regulatory agency. These agencies have regulatory flexibility which they can exercise in their decision making process. If it can be shown that the proposal would be more beneficial than onsite mitigation in maintaining the chemical, physical and biological integrity of this nation's waters, the regulatory agencies might consider approval of this type of mitigation.

3.2.4.3 Wetland Mitigation Banking

This is a form of offsite compensatory mitigation. This mitigation option should only be utilized when avoidance and minimization of impacts to wetlands is not practicable and when all attempts at onsite mitigation have been exhausted. This is one of the least desirable mitigation options.

3.2.4.3.1 Authority

- 1990 MOA EPA/DOA
- 33 CFR 320-330, Federal Guidelines for the Establishment, Use and Operation of Mitigation Banks

3.2.4.3.2 What is it?

"Banking" is a type of compensatory mitigation where a large scale mitigation site is constructed by a "sponsor" well in advance of any wetland impacts. "Banks" are typically restoration sites that have been constructed in anticipation of future wetland impacts within the "service area" of the bank. Wetland creation and enhancement sites are also given consideration although they are not favorably regarded. In rare circumstances credit it given for wetland preservation

Bank sponsors develop banks for the purpose of selling the acreage contained within the site (credits) to their clients. INDOT could buy credits from such a bank. The Erie Land Company Bank in Lake County is known to charge approximately $50,000.00 for an acre of wetland.

The Mitigation Banking Review Team (MBRT), in accordance with the Interagency Coordination Agreement (ICA) of November 1997, and with the 1995 Federal Guidance for the Establishment and Use and Operation of Wetland Mitigation Banks[xxi], is charged with the oversight of the development and management of Indiana wetland mitigation banks. The MBRT is composed of representatives from Louisville and Detroit Districts of the ACOE, the NRCS, the US EPA, the USFWS, and the IDNR. The IDEM has not yet agreed to sign the Agreement.

3.2.4.3.3 Implementation Measures

Bank sponsors are responsible for the development of a "prospectus" for the subject bank. The prospectus is a preliminary plan for a wetland mitigation bank. The prospectus contains the following information and guarantees[xxii]:

- Assurances that the bank is owned or by the sponsor
- Indications that the site contains a majority of hydric soils
- Assurances that there are no high quality wetlands within the site that would be negatively affected by the project.
- Contain upland buffers
- Proof that the site has a geomorphology such that it is conducive to a self-sustaining hydrology.
- Assurances that the site contains no hazardous or solid waste. This assurance should be backed by a Phase I Site Assessment
- Location and size (legal description)
- Delineation of any wetlands within the bank
- Identification of the type of mitigation bank (ex. single client, general use, market oriented)
- Method of credit production (i.e. restoration, creation, enhancement, preservation)
- Rationale for the proposed site design
- A statement as to compliance with the ICA
- Description of the banks viability. Describe surrounding land use and zoning, development and transportation plans
- A general site plan
- Outline of management, and maintenance responsibilities

- Preliminary construction plan and schedule of completion which should include preliminary administrative, management, monitoring and financial plans
- A list of the names and addresses of all adjacent property owners
- The name of the company or group that will hold the performance bond and or irrevocable letter of credit or will hold funds in escrow.
- Charter of incorporation, if appropriate
- Assurance through, legal documentation, that the bank can be maintained "in perpetuity"
- The bank shall be diverse (hydrologicaly and vegetatively) to the maximum extent practicable.
- Wildlife habitat shall be diverse
- Assurances that upland buffers will be included in the bank. Specify the width and area of all buffer zones
- Wetland functions to be created or enhanced
- Assurances that native plants will be used for revegetation
- Identification of the types and source of soil to be used at the site
- Explanation of the means for establishing appropriate hydrology
- Assurances that the design, maintenance and monitoring procedures have been developed in a manner which minimizes energy needs (ex. human intervention, weed and pest control, burnings, erosion control etc).

The available credits at the bank will be determined by the MBRT. Certified credits are sold at market value. 30% of uncertified credits may be sold as precertified credits. Uncertified credits are allowed to be debited from the account with the stipulation that the construction of the mitigation bank will be initiated at the beginning of the first growing season following the sale of the precertified credits.

The bank sponsor will be responsible for keeping a ledger of credits, debits and other pertinent transactions. These records will be distributed to the lead federal agency for auditing.

NOTE: If any member of the MBRT believes that a wetland mitigation bank is not meeting the requirements as stated in the charter they hold the right to revoke the charter and require the sponsor to forfeit any financial securities.

3.2.4.3.4 Status of Method

A handful of mitigation banks have been or are currently being developed in Indiana. There is the Lake Station Mitigation Bank in Lake County, the New Haven Farm Wetland Mitigation Bank at the Illinois/Indiana border White County Illinois, the proposed wetland mitigation bank near Peru Indiana, and the proposed US 231 bank in Tippecanoe County Indiana.

The IDEM has not yet agreed to sign onto the ICU. This has resulted in an inability to get mitigation very many banks approved at this time.

3.2.4.4 In-Lieu Fee Mitigation **The least desirable method**

It is not mandatory that the state MBRT utilize this procedure. It can be implemented by the states at their own discretion.

3.2.4.4.1 Authority

- 33 CFR 320-330, Federal Guidelines for the Establishment, Use and Operation of Mitigation Banks

- Federal Guidance on the Use of In-Lieu Fee Arrangements for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, October 2000.

3.2.4.4.2 What is it?

This is a form of compensatory mitigation that is much like mitigation banking except that the mitigation site is not constructed in advance of wetland fill activity. Implementation measures for development and management of the site must be addressed in a document in much the same fashion as was outlined in pertinent portions of section 3.2.4.3 of this report. This document must also be submitted to the MBRT for review and approval. In-Lieu Fee mitigation can only be undertaken in certain specific situations, these are as follows:

- When the impacts are authorized under an Individual Permit. The applicant must submit a document similar to the banking "prospectus" and must be approved by the MBRT prior to authorization.

- Impacts, Authorized Under a General Permit, are permitted when the following conditions have been shown to have been met.

  When it has been shown that On-Site Mitigation is not practicable or when it can be proven that in-lieu fee mitigation is environmentally preferable to on-site mitigation.

  Where On-Site Mitigation is not available or practicable. Use of a mitigation bank is preferable to the use of In-Lieu Fee mitigation regardless of the fact that the filled site might be outside of the banking service area. Only if it can be proven that that utilization of a mitigation bank is not environmentally desirable will In-Lieu Fee mitigation be allowed. Listed below are two examples of cases where mitigation banking might not be environmentally preferable.

  - Where banking does not provide "in-kind" replacement

  - Where banking does not provide restoration, creation or enhancement mitigation options.

3.2.4.4.3 Status of Method

In-Lieu Fee is a rarely used form of compensatory mitigation. From a regulatory standpoint the deficiencies are obvious. The chances for failure are high due to a lack of up-front proof of site quality and viability. This form of mitigation has not been used by the INDOT but may become a more common practice once state guidelines have been issued for the implementation of this method.

3.2.5 Monitoring Compensatory Mitigation Sites

3.2.5.1 Authority

1990 MOA EPA/DOA III D

3.2.5.2 What is it

Wetland monitoring is both a qualitative and quantitative method of surveying completed compensatory mitigation sites in order to make certain that the site is progressing towards fulfilling the success criteria as stated in the DOA 404 and IDEM 401 permits (IDNR permit criteria might also be needed).

3.2.5.3 Implementation Measures

The wetland monitoring process has several components; some of these are listed below:[xxiii]

- development of sampling plan and layout
- identification of baseline
- location of transects
- location of sampling points on transects
- establishment of permanent photo-stations
- quantitative measures of herbaceous cover
- identification of vegetation
- planted species identification and quantification
- soil sampling
- hydrology assessment
- data synthesis (Excel)
- report detailing: survival rates, % hydrophytic vegetation, relative densities etc.

Wetland monitoring must be undertaken once a year for each mitigation site for a period of at least three years (not including the post construction site documentation) whereupon ACOE approval is sought. If approval is denied monitoring will continue until the ACOE determines that the site has met the, permit specified, success criteria to its satisfaction.

3.2.5.4 Status

In-house personnel usually perform wetland monitoring at INDOT although some of the work is assigned to consultants. INDOT, or one of their vendors, monitored approximately 27 compensatory mitigation sites in the 2000 monitoring year.

INDOT has information needs that are not currently being met. Some of the information needs that we find we commonly in need of are:

- accurate records on planting dates,
- species substitutions
- design intent,

3.2.6 Site Remediation

3.2.6.1 Authority

33 CFR Part 326 - Enforcement

3.2.6.2 What is it?

Any time the permittee is determined, by the ACOE, to be in non-compliance with mitigation requirements of the permit, the Corps will take action. This action typically takes the form of a letter from the ACOE specifying that the compensatory mitigation is in noncompliance with the conditions of the permit. The letter typically contains stipulations requiring that the permittee take immediate corrective action to bring the project back into compliance.

3.2.6.3 How it is implemented

This corrective action can take many forms depending on the nature of the problem at the mitigation site. Replanting is a common form of remedial action; likewise the manipulation of water inflows and outflows is a common practice.

Wetland remediation is typically required for most wetland mitigation projects and thus should be planned for in advance. Listed below are a few of the reasons explaining why this happens:

- Time constraints
- Lack of trained personnel
- Lack of protocol for developing compensatory mitigation sites.
- Wetland mitigation is typically a low priority item relative to the developmental activities to which they are linked.
- Limited training in essential wetland design and construction skills.
- Limited ability to accurately quantify the inputs and outputs of the system.
- Limited tools and technology available to the designers
- Limited time to dedicate to research
- Landowner Rights conflicts

3.2.6.4 Costs

Remediation activities can become expensive if the permittee cannot achieve success. The remediation process can become an endless cycle of fixing and failure and fixing again. At sites, such as that just described, the ACOE may advise that the permittee begin looking for another mitigation site.

3.3 Federal Funding

3.3.1 Authority

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
Title 23 USC

Transportation Efficiency Act for the 21st Century (TEA-21)
Title 23 USC

3.3.2 How it works

ISTEA was put into law primarily to allow more funding for alternative forms of transportation. The law also contained provisions allowing for federal-aid participation in eligible wetland mitigation activities. TEA 21 granted an extension of the funding provided in ISTEA and with it brought new stipulations as to the use of the funds.

The FHWA issued a Final Rule in response to TEA-21. This final rule was published in the Federal Register at 23 CFR Part 777 entitled Mitigation of Impacts to Wetlands and Natural Habitat. The effective date for this rule was January 29, 2001.

The rule allows for federal funds to be expended on eligible wetland mitigation activities. The FHWA regulation establishes criteria by which mitigation activity will be assessed for eligibility. The criteria are based on the provisions of E.O. 11990 Protection of Wetlands and DOT Order 5660, Preservation of the Nation's Wetlands. Some of the criteria are listed below.

- There is no practicable alternative to construction
- The action includes all practicable measures to minimize harm

All qualified forms of wetland mitigation are eligible for federal participation. This includes expenditures required for avoidance, minimization as well as compensatory mitigation. The following is a list of various phases of project development where federal participation is available.

- Planning
- Design
- Construction
- Monitoring
- Land Acquisition
- Establishment of wetland

Before federal funds are released, the proposed mitigation will be required to undergo federal scrutiny in regard to the following parameters:

- The reasonableness of the public expenditure
- Evaluation of the importance of the impacted wetland
- A determination of the short and long term effects of the highway project on wetland resources.

4 The Future of Mitigation

4.1.1 Solid Waste Agency of Northern Cook County vs. Army Corps of Engineers

4.1.1.1 What is it?

On January 9, 2001 the United States Supreme Court ruled on Solid Waste Agency of Northern Cook County vs. Army Corps of Engineers. The case concerned the proposed filling of a sand and gravel pit in Northern Illinois by "SWANCC" for the purpose of creating a landfill. The Army Corps of Engineers (ACOE) had determined that the gravel pit had become an isolated wetland containing migratory birds during its period of inactivity and was thus within their jurisdiction. The case involved statutory and constitutional challenges to the assertion of Clean Water Act jurisdiction over isolated, non-navigable, interstate waters that are used as habitat by migratory birds.

The CWA used the term "waters of the US". The definition of this term was vague and it was left to the ACOE to interpret the meaning of the term. In the Code of Federal Regulations the ACOE provided definition to the term "waters of the US" [33 CFR 328(a) (3)].

The ACOE has historically included wetlands and other special aquatic sites in the definition of "waters of the US" by rationalizing that because these waters are used by migratory birds (which loosely contribute to interstate commerce) that they are of importance in interstate commerce. The Supreme Court determined, in their ruling, that the ACOE had overstepped the limits in regard to defining the extent of the interstate commerce clause. In coming to its decision, the Court stated that there would have to be a clear indication from congress that protection for isolated waters was intended. The Court's decision will have an affect on many water quality programs besides section 404. A summary of the effects on the 404 program is as follows:

- Field staff should no longer rely on the "Migratory Bird Rule" as their rationale for claiming jurisdiction over isolated waters.
- Wetlands adjacent to "waters" identified in 33 CFR 328.3 (a) 1,2,4,5,6 are still considered to be under ACOE jurisdiction.

- Waters that are considered isolated, nonnavigable and intrastate; may still be under ACOE jurisdiction if it can be proven that by filling these water bodies the degradation or destruction could affect "waters of the US" (ex. subsurface hydrological connections to "waters of the US").

4.1.1.2 Ramifications to Mitigation

As a result of this ruling more wetlands will be withdrawn from the purview of the ACOE. The large majority of isolated wetlands will be left unprotected. The need for wetland mitigation should be expected to dwindle. The following information was obtained from IDEM concerning the affects of the SWANCC decision on the 401 Water Quality Certification Program:

- IDEM reviews approximately 400 permit applications a year. 25% of these projects are concerned with isolated water bodies.
- IDEM estimates that of the projects that result in wetland or small waterbody impacts, 43% are considered impacts to isolated wetlands.
- IDEM estimates that more than 311,000 acres, or approximately 30%, of Indiana's 800,864 acres of wetlands are isolated.[xxiv]

From the information given above, one can get an idea of what the future demand for wetland mitigation will be. The IDEM is still waiting for further direction from the EPA/ACOE regarding the specifics for the implementation of the directions and procedures presented in a EPA/Dept. of the Army January 19, 2001 Memorandum. At this point in time one must exercise discretion in deriving the expected need for wetland mitigation based solely on the information provided by the IDEM.

The Supreme Court Decision may also have an affect on the way wetland compensatory mitigation is implemented. The adjacency aspect of the decision will affect the geomorphologic positioning of compensatory mitigation sites. In order for a compensatory mitigation site to adequately address functional replacement needs, it typically requires that the mitigation site have a similar geomorphologic setting as that of the impacted wetland. Therefore, one could led to believe that isolated compensatory mitigation will no longer qualify as adequate compensation for the host of regulated impacts that are occurring in areas that meet the adjacency criterion.

INDOT's policy on wetland mitigation will not be affected by this ruling. The INDOT will continue to protect all wetlands that meet the ACOE Determination Criteria. The ACOE criteria for identifying wetlands is outlined in the 1987 Federal Manual for Identifying Jurisdictional Wetlands. The procedures outlined in this manual will be the procedures that INDOT will use in determining what areas will be afforded wetland protection.

4.1.2 IDEM Title 327 Draft Rule Wetland Water Quality Standards

4.1.2.1 Authority

Clean Water Act

4.1.2.2 What is it?

Indiana is required by federal law (CWA via EPA National Guidance Document[xxv]) to establish water quality standards for all waters of the state including wetlands. This establishment takes the form of amendments to Title 327 IAC 2-1.8 (Standards) and Title 327 IAC 17 (Certification) rules to establish wetland water quality standards and new rules to establish procedures and criteria for review of projects requiring water quality certification under section 401 of the Clean Water Act.

4.1.2.3 Ramifications to Mitigation

The Draft Rules have yet to be preliminarily adopted. Development of the Rulemaking is on hold at the time of the writing of this report. IDEM is waiting for the EPA and the ACOE to provide a clear delineation of the limits of ACOE jurisdiction in regard to isolated wetlands, in light of SWANCC.

If the Draft Rules are adopted, it will have a significant effect on the way wetland mitigation is carried out. Mitigation will be held to much higher standards, than in the past, in regard to the preservation of the physical, biological and chemical properties of the "waters of the state". It will be the applicant's responsibility to provide the IDEM with adequate information indicating that the standards have been met. Getting this information could require that intensive chemical and biological studies be undertaken.

4.1.3 Compensatory Mitigation

4.1.3.1 Where do we currently Stand?

INDOT has been able to meet the expectations placed on it by the ACOE and IDEM in relation to satisfying permit requirements. INDOT has also been successful in obtaining regulatory agency approval for work involving wetlands.

INDOT has experienced some problems with meeting the success criteria for some of our compensatory wetland mitigation sites. This has meant that INDOT has had to go back to these sites and conduct remedial work. This work is undertaken in such a fashion as to create site conditions that are conducive to meeting the success criteria.

4.1.3.2 What can we Expect?

- More intensive studies, conducted upfront, can help to reduce the amount of remedial work.
- The ACOE and IDEM might experience a reduction in workload due to SWANCC. If this happens it might free up time for them to more stringently enforce strict adherence to the conditions of the 404 and 401 permits as they pertain to compensatory mitigation.

4.1.3.2.1 Technological Advances

Advances in CADD, digital terrain modeling systems, drainage modeling systems will allow INDOT to design "better" compensatory mitigation sites. Advances are also being seen in field equipment such as monitoring wells and piezometers. These devices have been combined with data loggers and memory chips to allow perpetual recording of ground and surface water levels. Computer based Geographical Information Systems (GIS) will also allow for better compensatory site positioning as well as permit better implementation of avoidance techniques, especially at the planning stage of road project development.

4.1.3.2.2 Advances in Wetland Science

Many studies in wetland science are being conducted throughout the world at this time. These studies will aid in the understanding the nature of wetlands and how they function. These studies will aid in compensatory mitigation design and construction.

4.1.3.2.3 Teamwork

INDOT is attempting to provide methods to improve communication among all of the parties involved in the wetland mitigation process. Cooperation among all participants will be needed to ensure that the product that is provided is of a quality befitting INDOT's seal.

4.1.3.2.4 Innovative Thought

Innovation is needed in the area of wetland mitigation. Each project that comes across one's desk is going to carry with it its own unique set of problems. Likewise these unique problems will have to be addressed with unique solutions. There is no green book or red book on wetland mitigation design that one can consult, just some basic underlying guiding principles and a few formulas. One must stay current on the latest innovations in wetlands and wetland mitigation. At this time this means reading and studying the many reports, theses, papers, journals, books etc one can get their hands on. Communicating with various resource agencies and professionals that work with wetlands is one of the best ways to get material to the brain for the production of innovative thought. Keep in mind Carol Browner's statement that is quoted on page 1 of this report, "look to the ecosystem itself, evaluate its needs based on risk ". Use Carol Browner's statement as a base and then allow innovative thought to germinate and grow from there.

5 Close

TABLE OF CONTENTS

ENDNOTES

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