Section 404 of the Clean Water Act and Resulting Wetlands Mitigation for Selected Counties of Northern Ohio[1]

EMMANUEL K. MBOBI, Department of Geography, Kent State University – Stark Campus, Canton, OH 44720

ABSTRACT. This study examines Section 404 of the Clean Water Act to determine its impact on the destruction of wetlands. The data for this study was obtained from the Army Corps of Engineers (ACOE). Included is the number of Section 404 permit applications received by the ACOE during the period 1990 to 2001 and the action taken on these applications for six northern Ohio counties — Lucas, Ottawa, Portage, Summit, Stark, and Wood. During the study period a total of 1,676 applications were received from the six counties. 79.3% of the applications were issued by the ACOE. Less than 1% of the applications were rejected, and 17% of the applications were withdrawn before action was taken. In all, these counties requested 283.5 acres of wetlands for filling. 238.4 acres were approved for destruction, and 586.82 acres were proposed for mitigation by the ACOE. The core of this study is mitigation results. The ACOE has no record certifying that proposed mitigations were carried out. They blame this on insufficient manpower to undertake the investigative task. Consequently, wetlands have been destroyed in anticipation of mitigation without corresponding mitigation activities. Most mitigation is conducted by conservation groups through mitigation banking. Their information is sketchy and their data is hard to obtain. For mitigation to work, the ACOE and EPA need to generate a feedback loop to monitor mitigation activities, a condition which is currently lacking in the organizational structure of the ACOE.

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INTRODUCTION

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin and others 1979). Because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance, they vary tremendously. Wetlands are located almost everywhere on the planet ranging from the tropics to the tundra regions. The only continent with the absence of wetlands is Antarctica, which is perennially frozen.

For regulatory purposes under the Clean Water Act, the term wetland means "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. These areas generally include swamps, marshes, bogs and similar areas" (USGAO 1988).

Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promotes the development of characteristic wetland (hydric) soils (Tiner 1999; Nebel and others 1998). Regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance, tend to create the variations in wetland types. Wetlands therefore can be put under two general categories: coastal or tidal wetlands and inland or non-tidal wetlands.

Coastal wetlands in the United States are found along coastal areas along the Atlantic, Pacific, Alaskan, and Gulf coasts. Because of their interaction with saline water from the sea or ocean, they are also called salt marshes. These areas are closely linked to our nation's estuaries, where seawater comes into contact with fresh water to form an environment that displays some variations in salinity. Such an environment still gives rise to some plants and animals that have successfully adapted themselves to these landscapes. In tropical climates around the world, wetlands are known as mangrove swamps and, in some cases, tidal freshwater wetlands form beyond the upper edges of tidal salt marshes where the magnitude of salt water diminishes.

Inland wetlands are commonly found on floodplains along rivers and streams and are termed riparian wetlands. They are also found in isolated depressions that are surrounded by dry land mostly in and environments and along the margins of lakes and ponds. Wetlands are known by a variety of names in different locations—names such as playas, basins, potholes, and pocosins (Tiner 1999). Inland wetlands are also known as freshwater swamps.

Importance of Wetlands

Wetlands are important for a number of reasons. They comprise one of the earth's most productive natural ecosystems, and this is precisely why most of them have been drained for agricultural purposes. They play an important role in maintaining wildlife species and perform a host of other functions such as providing vital resting, breeding, and feeding habitats for birds, especially waterfowl. Tidal wetlands are the birthplaces of countless sea creatures. Wetlands help to regulate and maintain

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the hydrology of the nation's rivers, lakes, and aquifers by storing and slowly releasing floodwaters. Furthermore, they maintain the quality of water by storing nutrients, reducing sediment loads, and reducing the potential problem of erosion (Mitsch and Gosselink 1986; Kusler and Brooks 1987; Salveson 1990; Tiner 1999) (Fig. 1).

Disappearance of Wetlands in the United States

Over 220 million acres of wetlands are thought to have existed in the lower 48 states at the time Europeans set foot in America more than 200 years ago (Dahl 1988). Since then, extensive losses have occurred and over half of our original wetlands have been drained and converted to other uses. From the middle of the 1750s to the 1970s, there have been major wetland losses in the United States (Dahl 1988); since then the rate of loss has decreased but not completely diminished due to Section 404 of the Clean Water Act (CWA), which came into existence in 1972 (Johnson 1992). In the middle of the 1980s the lower 48 states contained an estimated 103.3 million acres of wetlands. An estimated 170-200 million acres of wetlands exist in Alaska, covering slightly more than half of the state. Hawaii still has about 52,000 acres. Florida has about 11 million acres, and Louisiana with about 8.8 million acres, Minnesota with some 8.7 million acres, and Texas with about 7.6 million acres, makes them the states with the largest wetland acreage in the United States (Tiner 1988).

Estimates of recent wetland trends on non-federal lands indicate that there is a downward spiral in the loss of wetlands—a rate that runs between 70,000 to 90,000 acres annually despite the Section 404 permit system. Draining of wetlands for agricultural purposes has continued to decline probably because of the Swamp Buster provision or the Farm Bill instituted after 23 December 1985 and the farm bill of 1990 (http://www.usbr.gov/laws/foodsafe.html). The Wetland Conservation provision (Swampbuster) of the 1985 and 1990 Farm Bills "requires all agricultural producers to protect the wetlands on the farms they own or operate if they want to be eligible for USDA farm program benefits. Producers will not be eligible if they plant an agricultural commodity on a wetland that was converted by drainage, leveling, or any other means after December 23, 1985, or convert a wetland for the purpose of or to make agricultural commodity production possible after November 28, 1990" (http://www.usbr.gov/laws/foodsafe.html). Before 1985, the same provision gave subsidies to farmers who drained wetlands for agricultural purposes.

Development still accounts for the bulk of wetland destruction even though federal farm policies discourage drainage and encourage restoration, more effective governmental regulation, land owner stewardship, acquisition and protection of sensitive environmental areas, and more state, tribal and local involvement in wetland programs (Heimlich and Langner 1986.)

According to a report by the National Research Council (NRC) the government's efforts to protect our nation's wetlands are inadequate, resulting in the destruction of wetlands (http://www.nwf.org/wetlands/nationalresearchcouncil.html). The report seems to support the position long held by the National Wildlife Federation (NWF) that wetlands are continuously being lost, despite strict laws that attempt to protect these ecosystems from destruction. More disturbing is the fact that the US Army Corps of Engineers, the agency that is responsible for protecting this nation's wetlands, and other federal and state agencies believe that wetland mitigation programs imposed on developers are sufficient to ensure that no net loss of wetlands occur (http://www.nwf.org/wetlands/nationalresearchcouncil.html). In fact, as the results of this limited study shows, mitigation efforts fall far short of replacing wetlands lost to development as will be discussed later. In addition to these losses, many wetlands have suffered a degradation of their functions, although attempting to depict the magnitude of their degradation could be a difficult venture. These losses, as well as degradation of these environmentally sensitive areas, have greatly diminished our nation's wetland resources. Consequently, these degraded wetlands are no longer able to perform their natural functions. This is evident in the increase in flood and drought damage, the declining bird population, lower aquifers, and groundwater pollution (www.epa.gov/owow/wetlands/40cfr/231.html#231.02).

Besides the destruction of wetlands through dredging or filling, wetlands are being systematically destroyed through chemical contamination and excess nutrients that have resulted in eutrophication of local streams, rivers, and lakes. Global climatic changes have also affected wetlands through a shift in precipitation, an increase in air temperature leading to droughts, increased storm frequencies resulting in frequent flooding, sea level rise that could impact coastal wetlands, and increased atmospheric carbon dioxide concentrations that can easily affect the aquatic composition of wetlands and also impact their functions.

Destruction of Wetlands

Throughout history, wetlands have been considered wastelands—dangerous and useless swamps and mires—which resulted in public policies that allowed individuals to buy swamps and marshes for as little as 10 cents per acre and subsequently destroy them (Cunningham and others 2003). The Swamp Buster Provision that existed before December 1985 was a federal provision that encouraged the drainage and filling of wetlands in order to create more agricultural land.

In view of these threats to the very survival of wetlands, one would think that everything possible would be done by the government agencies charged with that responsibility to protect these environmentally sensitive areas as one of our most revered natural resources. Even with policies in place to crack down on illegal destruction, studies reveal the continuous illegal disappearance of wetlands caused by: 1) individuals who simply destroy acres of wetlands without reporting them to the authorities, and 2) to some degree through the issuance of Section 404 permits with the assumption that mitigation is going to occur. The disappearance of wetlands is fostered by individual permits that are issued to single

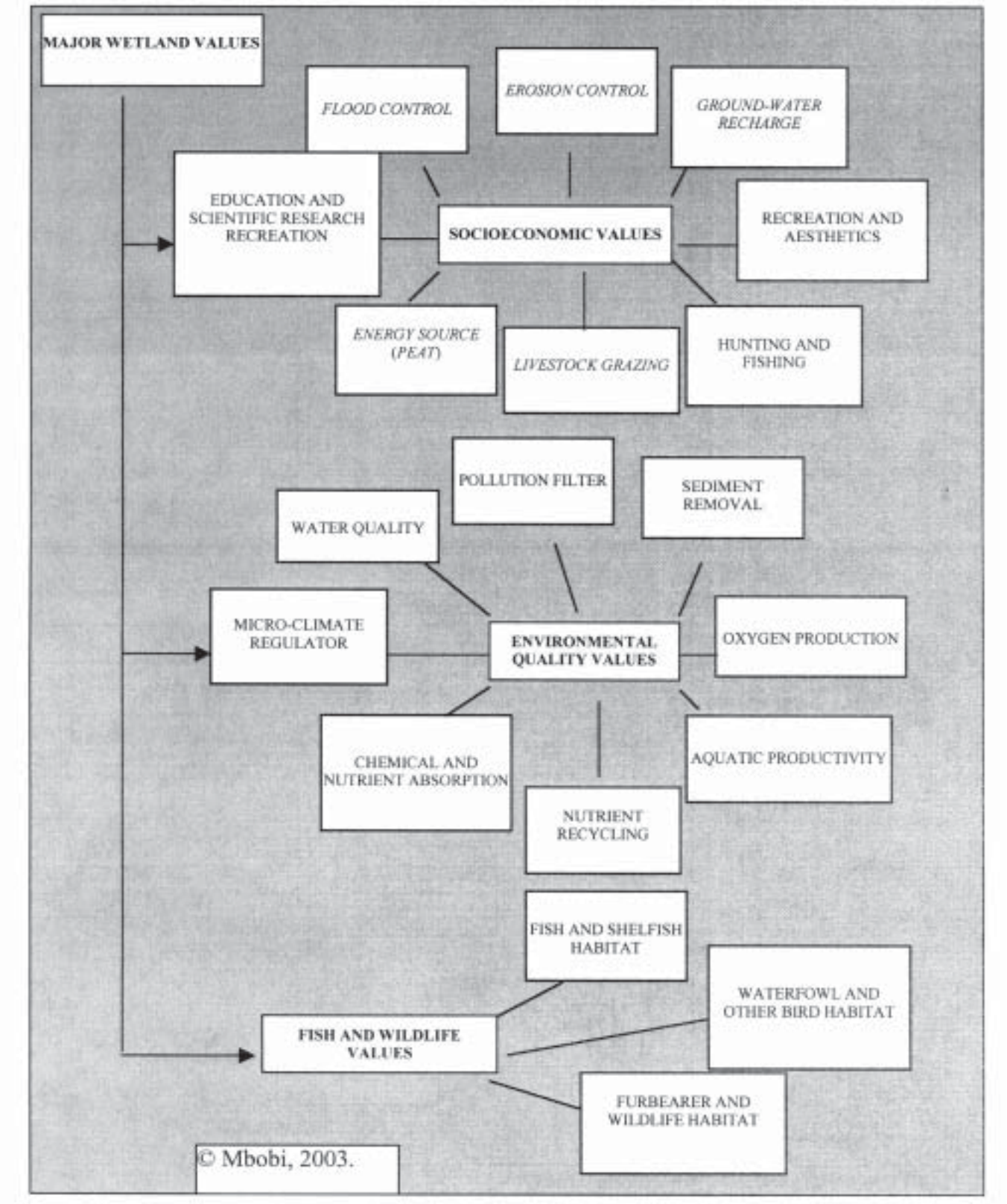

FIGURE 1. Wetland values.

entity (individuals or companies) and by nationwide permits that stipulate the procedures to be followed by administrators of the Environmental Protection Agency (EPA). The EPA is authorized to prohibit or otherwise restrict a site whenever it is determined that the discharge of dredged or fill material is having or will have an "unacceptable adverse effect" on municipal water supplies; shellfish beds and fisheries, including spawning and breeding; wildlife; or recreational areas (www.epa.gov/owow/wetlands/40cfr/231.html#231.02). If there is the lack of monitoring manpower to enforce mitigation activities, there is always the possibility that wetlands

could be unintentionally lost through the issuance of Section 404 Permits. If this occurs, it means therefore, that the general quantity of wetlands will be reduced by the amount of wetlands that have been approved for destruction and not mitigated.

MATERIALS AND METHODS

Six counties in Northern Ohio were profiled (Fig. 2) to determine the number of Section 404 permit applications that were received and processed by the Army Corps of Engineers between 1990 and 2001 from these counties (Table 1).

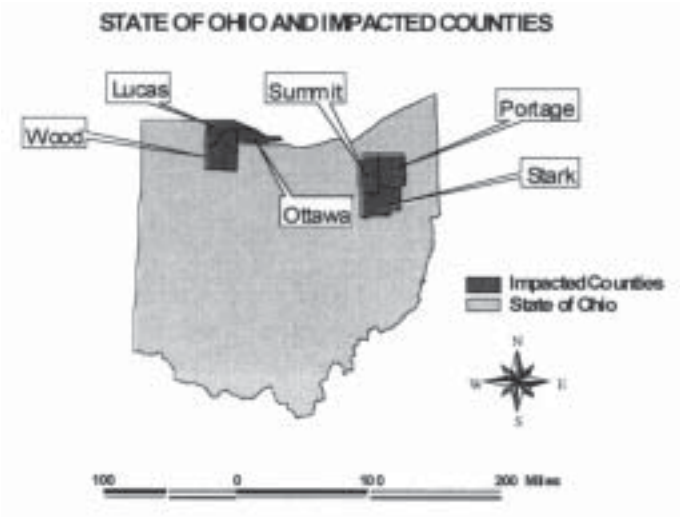

FIGURE 2. Section 404 permit applications and impact area in northern Ohio.

As Table 1 indicates, among the six counties profiled—Lucas, Wood, Ottawa, Summit, Portage, and Stark—only Stark County showed that a very small area of wetlands, 0.29 acres, were filled. Wood County followed next with 7.62 acres over a period of 11 years. Counties that topped the list in filling wetlands were Summit with 108.631 acres and Lucas with 61.976 acres. Portage County lost 35.608 acres and Ottawa County lost 29.608. A total of 238.413 acres were lost as a result of Section 404 permits during the period from 1990-2001. These numbers appear small but projecting these findings to the remaining 82 counties means a huge loss.

The "No Net Loss" Policy

In 1989, during the Bush/Quail administration, the Corps of Engineers and EPA entered into a memorandum of understanding, in which it was agreed that the Corps of Engineers would exercise authority in reviewing Section 404 permit applications as to minimize any loss of wetlands; a memorandum that has become the basis for the "no net loss" of wetlands policy. Under this policy wetlands banking was also created, which became a prelude to maintaining the "no net loss" policy. However, the policies in place seem to be increasingly relaxed. According to the data presented in Table 1, Lucas County requested 74.826 acres, and 61.976 acres were approved. The ACOE recommended a mitigation of 138.49 acres. In Ottawa County 43.89 acres were requested and 29.29 were authorized by the ACOE with a proposed mitigation of 130.49 acres during the study period. In Portage County, 48.19 acres were requested. The ACOE approved 35.61 acres and recommended 81.61 for mitigation. In Summit County, the amount recommended for mitigation was even larger, 222.06. The county had requested 108.65 acres and was granted 103.631 for filling. In Wood County, 7.26 acres were requested for filling and 14.26 acres recommended for mitigation. The least number of applications came from Stark County. Only one application was received requesting the filling of 0.26 acres. The Army Corps of Engineers authorized that amount, and no acreage was indicated for mitigation. Figure 3 shows a composite of the ACOE

TABLE 1

*Section 404 permit applications received and processed by the Army Corps of Engineers between 1990 and 2001 for specific counties in Ohio.**

Counties	Applications				Requested Acreage	Authorized Acreage	Proposed Mitigation
	Received	Issued	Denied	Withdrawn			
Lucas	326	273	2	46	74.826	61.976	138.49
Ottawa	674	523	7	105	43.888	29.288	130.40
Portage	203	152	2	43	48.185	35.608	81.61
Stark	1	1	0	0	0.290	0.29	0.00
Summit	386	310	0	70	108.650	103.631	222.06
Wood	86	71	0	18	7.620	7.62	14.26
Totals	1,676	1,330	11	282	283.459	238.413	586.82

*Data obtained from the Army Corps of Engineers, Buffalo District.

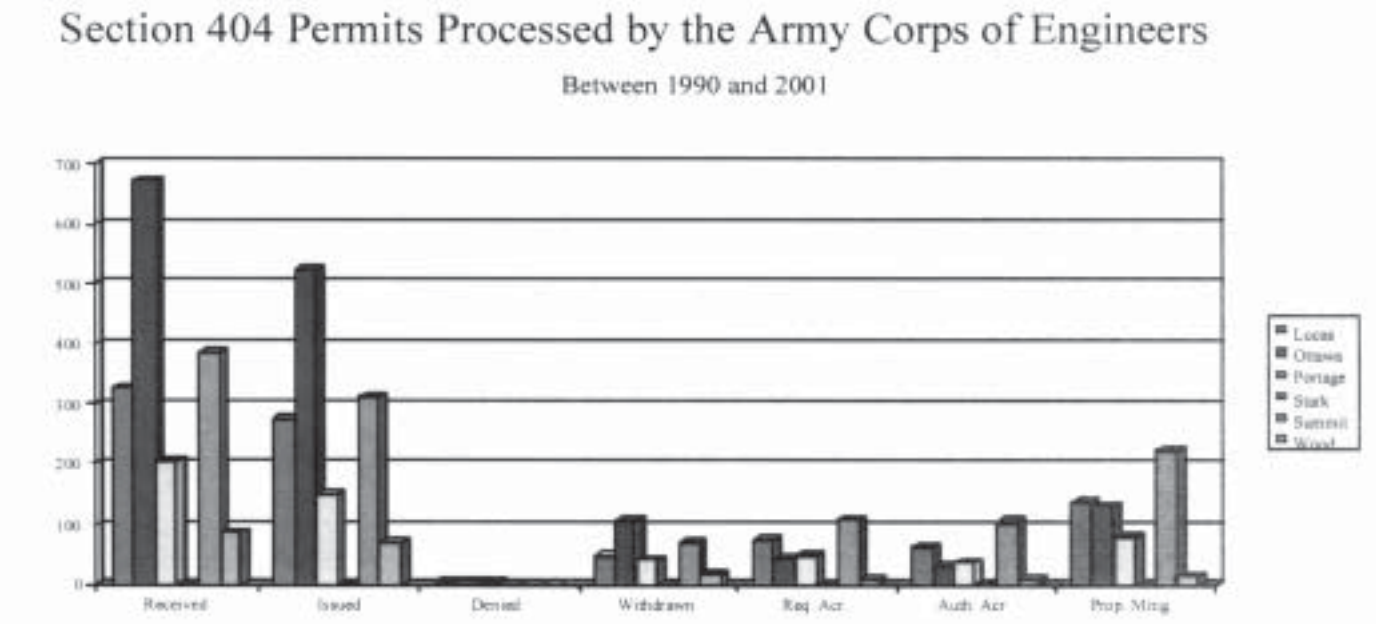

FIGURE 3. Composite of ACOE permit activities in all six Ohio counties.

permit activities in all six counties during the study period 1990-2001.

As can be seen from the data presented in Table 1, proposed acreage for mitigation is twice as much as the acreage approved by the ACOE for destruction. There are a number of reasons advanced by the ACOE for this large amount of mitigation acreage. First of all, when making a decision regarding the appropriateness of mitigation, consideration is given to the functions and values of the wetlands that will be lost, the functions and values of the proposed replacement wetland(s), temporal losses, and other site specific considerations (such as endangered species, scenic rivers, historic properties, and so on). Secondly, increasing the required compensatory mitigation also compensates for the overall loss to the aquatic environment during the time period between the initial loss and the full replacement of wetland functions (for example, the time it takes to replace successive vegetation, habitat structure, organic soils, microorganisms, and so forth) and finally, increasing the required compensatory mitigation acreage is also relevant during the resolution of a violation, or situations where wetland impacts occurred without a permit. When this happens, the ACOE loses the opportunity to work with the applicant to avoid and minimize wetland impacts through the permit application process. By increasing mitigation requirements the lack of opportunity for avoidance and minimization, as well as the temporal loss of functions and values, is addressed (Montone, ACOE Buffalo District, NY, personal communication).

RESULTS

Mitigation and Mitigation Banking

Section 404 of the Clean Water Act seems to have become a legal tool for the destruction of wetlands simply because the ACOE does not have any data on mitigated wetlands. The proposed mitigation activities for the six counties look good as indicated by Figure 4. According to the data, the six counties should have a wetland's net gain of 348.407 acres. Unfortunately, the Army Corps of Engineers does not have any records of accomplished mitigation activities for the period 1990-2001 for the six counties and has blamed the absence of data on inadequate manpower to carry on the task of monitoring the mitigation process. Ohio is among states that have topped the loss of more than 90% of their original wetlands.

On a Micro scale, the most productive of mitigation activities in Ohio is wetland banking, which is currently being undertaken by some conservation organizations. These are private conservation organizations that are committed to preserving wetlands and are not aligned with either the ACOE or the EPA. Most of the information on mitigation banking is still in its infancy and is fraught with financial problems in running costs. According to data obtained from one of these conservation organizations, 31.519 acres were impacted in a number of Ohio subdivisions and 51.3 acres were purchased creating a no net loss of 19.781. This information is just from counties and or subdivisions where conservation organizations are actively involved in trying to protect wetlands.

On a macro level, the Fish and Wildlife Service's Partners for Wildlife and the North American Waterfowl programs have provided funding for wetland restoration (Cunningham and others 2003). Another program for wetlands restoration is the Department of Agriculture's Wetland Reserve Program and Conservation Reserve Enhancement Program that has reestablished more than 210,000 acres of wetlands on formerly cultivated fields and floodplains. Globally, wetland losses are monitored by the Ramsar Convention, an international organization established at a 1971 meeting in Ramsar, Iran. This organization has two major objectives:

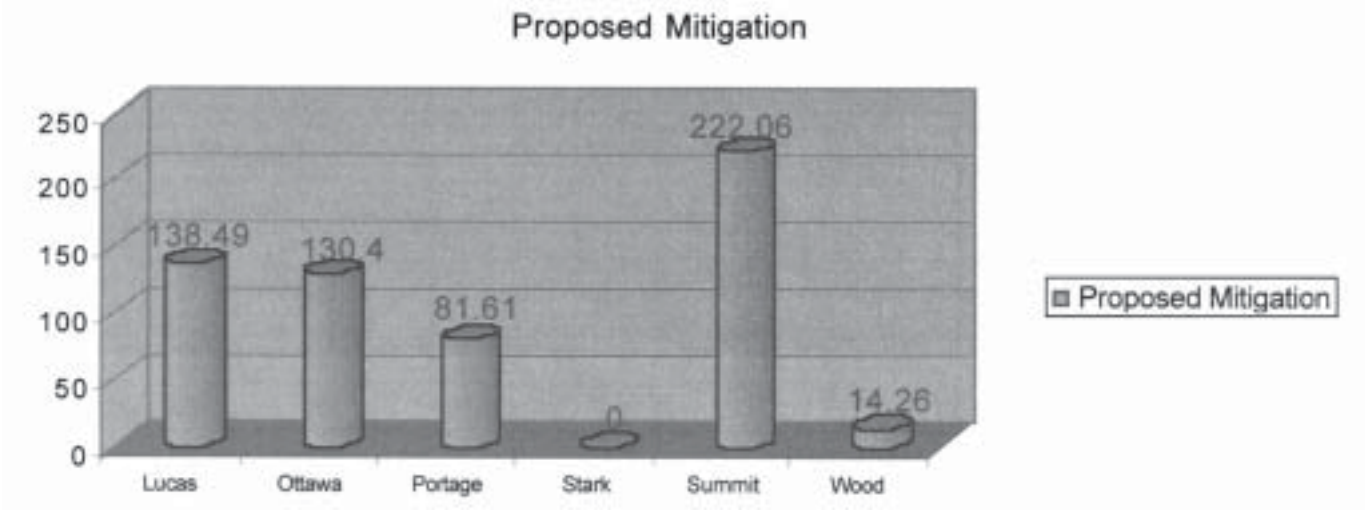

FIGURE 4. Proposed mitigation for the six Ohio counties.

establishing baseline information about global wetland areas and wetland losses, and creating an international awareness of the importance of the ecological services provided by wetlands (Cunningham and others 2003).

In the United States, the "No Net Loss" principle is a convenient companion to mitigation and mitigation banking. With mitigation, a regulatory agency will allow the replacement of a small area of isolated wetland by an equivalent area of the same type in a large tract that will be maintained in perpetuity. This means that a small wetland area needed for development can be filled or its functions eliminated when an equal area with the same functions could be built and made operational. A wetlands mitigation bank is a wetland area that has been restored, created, enhanced, or preserved and set aside to compensate for future conversions of wetlands for development activities. A wetland bank may be created when a government agency, a corporation, or a nonprofit organization undertakes such activities under a formal agreement with a regulatory agency, and the value of such a bank is determined by quantifying the wetland values restored or created in terms of "credits." (http://www.epa.gov/owow/wetlands/facts/fact16.html).

Mitigation banking therefore plays an important role in Section 404 regulatory process by reducing uncertainty and delays, as well as improving the success of wetlands mitigation efforts (http://www.epa.gov/owow/wetlands/facts/fact16.html). Landowners needing to "mitigate" or "compensate" for authorized impacts to wetlands associated with developmental activities may have the option of purchasing credits from an approved mitigation bank rather than restoring or creating wetlands on or near the development site (hftp://www.epa.gov/owow/wetlands/facts/fact16.html). Wetland mitigation and mitigation banking can be constructed in advance by a land development agency and credits sold or withdrawn as necessitated by prevailing circumstances. Without such mitigation banking, effective "No Net Loss" policies would require much higher skills from planners and developers, or much greater vigilance from enforcement agencies trying to ensure that no net losses occur. Wetlands creation is the last of mitigation strategies, though it is probably the first in people's minds when they think of wetlands mitigation (Salvesen 1990). This strategy would involve the creation of wetlands from scratch—turning dry woodlands into swamps, and sandy shores into salt marshes.

Environmental groups, resource agencies, and some biologists oppose wetland creation because they assert that it is fraught with risk and uncertainties. In contrast, wetland creation is strongly supported by the Army Corps of Engineers, developers, and especially some environmental consultants who have been moving around the country creating wetlands where none existed, with varying degrees of success.

Building a wetland sounds easy enough, but replicating a natural wetland is problematic. Like all natural systems, wetlands are complex, dynamic environments that have evolved over millennia and occur in areas where the natural conditions such as topography, soils, hydrology, and climate are favorable for their formation. The delicate interdependencies among hydrophytic vegetation and animals are not fully known and therefore difficult to recreate. Superficially, artificial wetlands may appear equal to natural wetlands, but on a closer examination, subtle but important differences often emerge. For example, created and natural wetlands may contain similar plant mixes, but a new wetland may lack the nutrient-cycling capabilities and productivity of a natural wetland (Salvesen 1990). Ideally, the created wetland should provide the same functions as natural wetlands, but realistically, replacing all the functions is difficult. With all of these complications and the costs associated with mitigation, the laxity of the Army Corps of Engineers in monitoring the mitigation process is a welcome relief to those who are charged with mitigating destroyed wetlands.

DISCUSSION

The Rational Comprehensive Model, Mitigation, and the Feedback Loop and Section 404

Policies and regulations made should not end the regulatory process which is, probably, what has happened with the enforcement strategy of the ACOE and EPA.

After granting the filling of wetlands through Section 404, and after indicating the amount of wetlands to be mitigated, the process of the ACOE and the EPA seems to end there. From that point on, neither the EPA nor the ACOE can certify that the amount of wetlands which were earmarked for mitigation have indeed been mitigated. This lack of data on mitigation is dangerous because it could undermine the whole process of mitigation and the "no net loss" process. Consequently, there needs to be a feedback loop to test the efficiency of the policies in place, in this case, the part of Section 404 responsible for mitigation.

Many laws have been passed ranging from federal, state, and local to protect wetlands, but wetlands are still being lost because of inadequate monitoring procedures. The state of affairs of wetland protection is even more distressing now than ever before as the ACOE and the current administration are working in concert to relax some of the wetland laws that have worked in the past (Grunwald 2002). Some of the laws that have been weakened include the general permits that allow small plots of wetlands to be filled without individual permit reviews by the ACOE, and also the Nationwide Permit 26, which allows expedited permits for up to 10 acres of "isolated" wetlands. As a result, it is difficult to document whether the wetlands that have been filled in anticipation of mitigation have been mitigated or not. If they have not been mitigated, the "no net loss" policy of wetlands over time is meaningless. To solve this problem, there should be a feedback loop that can monitor the situation to make sure that wetlands are mitigated.

The Rational Comprehensive Model can be used not only for decision making but also to monitor activities through its feed back loop (Fig. 5).

This model deals with decision-making, starting from the problem phase, objectives, alternatives, the making of choices, and implementation. Most of the wetland policies end with implementation, and there are no policies toward impact, feedback, and evaluation of the policies. This final stage is absent in the monitoring process, which has led to the problem of the ACOE and EPA not being able to know if wetlands that have been earmarked for mitigation have actually been mitigated.

Conclusion and Recommendations

Most regulatory programs contain exemption categories for a host of activities such as agricultural, silvicultural, and sometimes mining activities. These regulatory programs are typically vulnerable to economic arguments allowing for the development of wetlands, and often rely on the safety net of mitigation to offset wetland losses or degradation. Yet, technology and reliability of wetland mitigation lags behind in the expectations placed on it. In a larger perspective, regulatory programs are the reactive, compulsory arm of wetland protection, and in the long run can only provide partial protection. Despite the efforts of regulatory programs and private

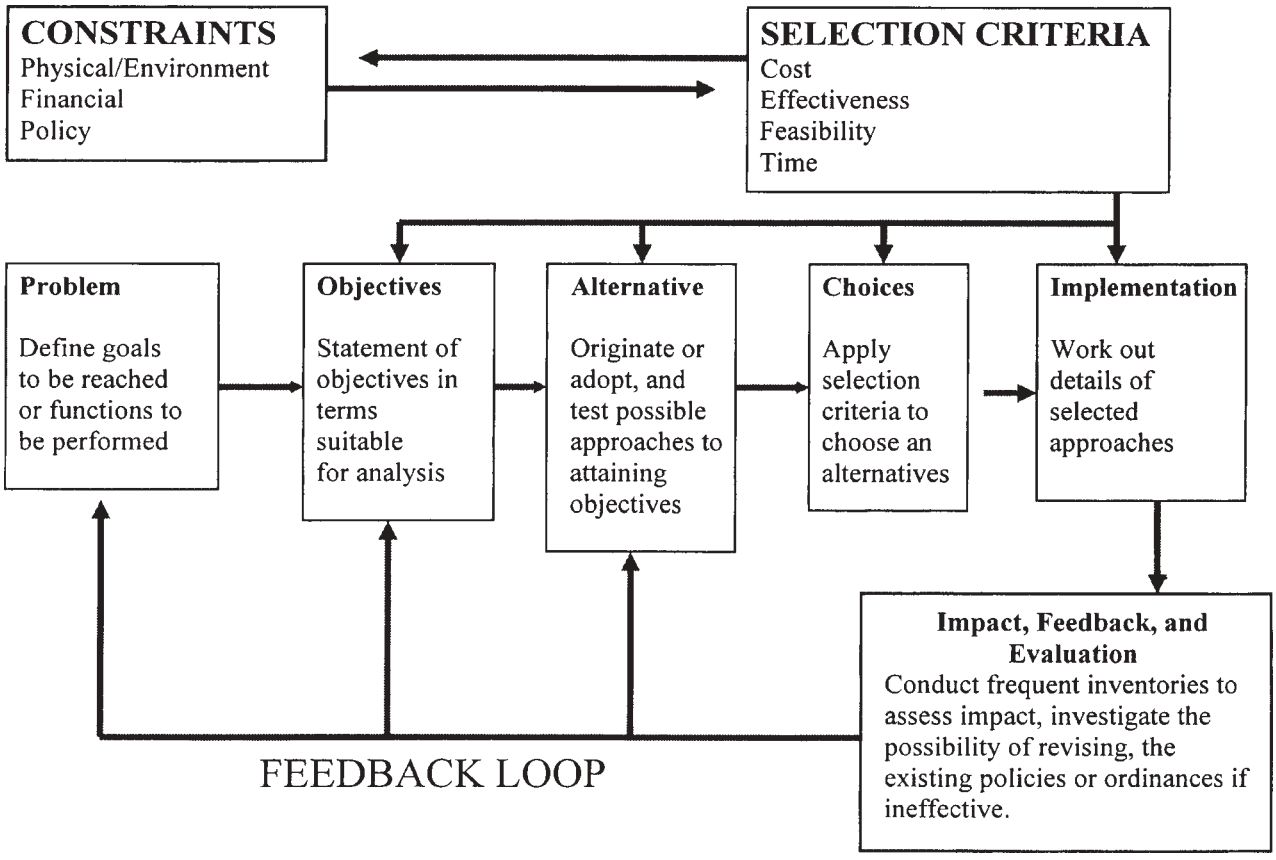

FIGURE 5. The rational comprehensive model, mitigation, and a feedback loop. (Adapted and modified from "Managing Urban America by Morgan," 1989. Mbobi © 2003)

conservation organizations, degradation and destruction of wetlands will continue unless offset by additional protection approaches such as monitoring through some feedback loop. In the case of Ohio, 238.413 acres were authorized by the Army Corps of Engineers for filling. It is not known by the ACOE if the mitigation of 586.82 actually occurred. Remember that only six counties were surveyed. A projection of the remaining 82 counties could indicate a huge loss of wetland acreage.

Approaches needed to achieve comprehensive wetland protection must be proactive, farsighted, and have planned strategies that utilize positive motivation in order to succeed in the long-term. These can be grouped by type of approach: incentive/disincentive; acquisition/legal restriction; restoration; and others, including policy statements, educational efforts, inventories, and monitoring. Each has its advantages and disadvantages, and all are needed to effectively protect wetlands. For example, regulatory programs are essential for basic wetland protection and for recourse when detrimental impacts occur. Incentive/disincentive programs provide wetland property owners with a reason to protect wetlands without requiring an enforcement presence. But incentive programs tend to apply only to certain land use activities, and incentive mechanisms can become less compelling over time as economic forces change. Acquisition greatly increases the likelihood of minimizing detrimental impacts to wetlands, as do legal restrictions, short of acquisition, depending on their design. Acquisition and some legal restrictions provide limited coverage because of funding constraints, and some legal restrictions require active enforcement, which seems to be absent at the present time.

Restoration is important for correcting historical damages, but should be coupled with legal protections and, again, is invariably limited by funding. Policy support and educational efforts are essential in the long run, but are inadequate without favorable economics or enforceable authority. Thus, a combination of these approaches is essential for the effective short and long-term protection of wetlands.

Many opportunities exist for private citizens and corporations to assist federal, state, and local government agencies in slowing the rate of wetland losses and improving the quality of the nation's remaining wetlands. Individual landowners and corporations own the majority (75%) of the nation's wetlands and they are in a key position to determine the fate of wetlands on their properties (Salvesen 1990).

Recommendations

Wetland policies are difficult to implement on private property because of the conflict between landowners and all levels of government control. As a result, it might be beneficial to all parties concerned if some incentives were given to property owners who have wetlands on their property to assist in wetlands protection. This may avoid any action that landowners might take against the government, which they deem as hostile. Often government actions are misconstrued by landowners as "takings" by their local governments. Incentives in the form of tax breaks to the wetland property owners by their respective cities may be effective in avoiding suits against the government by landowners who feel that their land has been taken without just compensation which is a violation of their 5th Amendment rights. Another alternative may be for the city to buy the environmentally sensitive lands from landowners instead of asking landowners to donate these lands to the city. In which case, at least landowners could reap some benefits from his or her property, and the various branches of government would avoid any lawsuits against them from those individuals, thereby benefiting both the landowners and the branches of governments involved.

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