MITIGATION BANKING AND WETLANDS CATEGORIZATION: THE NEED FOR A NATIONAL POLICY ON WETLANDS

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Mitigation Banking and Wetlands Categorization:

The Need for a National Policy on Wetlands

The Wildlife Society

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Foreword

Presidents of The Wildlife Society occasionally appoint ad hoc committees to study and report on selected conservation issues. This has worked reasonably well, but experience indicated a need to standardize the procedures. On advice from the Publications Committee in 1989, the Society's governing Council agreed to refine its oversight role, to appoint an editor or editors to assist committees, and to establish standard formats for the committee reports.

The reports ordinarily appear in two related series called either Technical Review (formerly "White Paper") or Position Statement. The review papers present technical information and the views of the appointed committee members, but not necessarily the views of their employers or The Wildlife Society. Position statements are based on the review papers, and the preliminary versions ordinarily are published in **The Wildlifer** for comment by society members. Following the comment period, revision, and Council's approval, the statements are published as official positions of The Wildlife Society.

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SYNOPSIS

Wetlands represent a small fraction of land area, but they harbor an unusually large percentage of wildlife. Natural wetlands once occupied 11% of the 48 contiguous states, but now occur on 5% - a loss of over 50%. Recently, the federal government and many states have implemented protective legislation and regulations, but none represents clearly defined national policy; hence, the confusion, controversy, costs, and disenchantment with present approaches. In contrast to wetland drainage regulation, a wetland protection/management policy is not determined and codified. Only consensus establishment of a national policy on wetland protection/management embodied in national legislation and unified implementing regulations will resolve present confusion. Enormous historical losses of wetlands, the importance of wetland functions, and their values to society, mandate a national policy to implement a NET GAIN or NET RECOVERY of wetlands. **The national goal should be to restore 25% of the original wetlands acreage until the combined wetland resource base of 75% of the original is attained.**

The Wildlife Society believes that protective legislation should base permit decisions on whether or not the society can afford to lose a wetland, rather than whether or not a wetland can be replaced. This is an endorsement and extension of the current philosophy of:

1) encouraging wetland restoration whenever and wherever feasible and practical;
2) minimizing detrimental impacts to wetland form and function when avoidance is not feasible or practical; and
3) compensating detrimental impacts to wetland form and function when those occur.

Mitigation

Despite society's desire to protect remaining wetlands, some water-related projects are impossible without impacting wetlands. Current regulations require compensatory mitigation of wetland impacts which expand the regulators' role from approval or denial to negotiated mitigation and development. Due to the broad scope and many interpretations of the term, The Wildlife Society defines **wetland mitigation** as: **replacement of the form and function of the wetland that will be impacted detrimentally.** Inclusion of function is important since current mitigation is based largely on replacement of wetland form (i.e. physical components of the impacted wetland) and replacement of form may or may not replace important wetland functions.

Failures of some compensatory mitigation projects are not reason to reject the concept. Many failures are due to the lack, or improper application, of existing knowledge because too few developers employ experienced biologists in the design, construction, and operation of wetland projects. Regulatory agencies should require restoration or enhancement of existing wetlands as mitigation rather than new wetland creation. Where restoration or enhancement is not feasible, mitigation to create new wetlands may be acceptable if:

1) documentation is available on the success of projects creating similar types of wetland in that region; or
2) the permittee provides funding for research on similar natural wetlands in the region that would identify means by which the form and function of the impacted wetland could be duplicated in a newly created wetland; and
3) the permittee ensures that development of the new wetland is conducted under the direction of competent biologists employing current information or information obtained from studies on the model natural wetland; and
4) the permittee agrees to provide for long-term monitoring to ensure the new wetland is functional and self-perpetuating; and
5) the permittee agrees to provide for long-term financial support through an irrevocable trust to ensure funding for necessary management.

Mitigation Banking

Existing regulatory delays and the inability of some developments to avoid detrimentally impacting wetlands has led to proposals for establishing wetland mitigation banks to facilitate compliance with replacement requirements. **Wetland mitigation banking is the philosophy and process through which negotiated development and permit approvals result in acquisition and protection or restoration of natural wetlands, creation of wetlands, and the accounting procedure by which losses or gains are recorded and monitored.**

The present regulatory quagmire neither protects wetlands nor accommodates economic development in an orderly, cost-effective manner. Present regulations may contravene society's goals to protect and restore wetlands. New regulations must have more latitude to encourage and support wetland restoration/creation projects by various organizations on private and public lands.

Mitigation banking may have many positive as well as negative impacts on wildlife, wetlands, and society. Wildlife scientists and managers must initiate a proactive approach to mitigation and mitigation banking and develop guidelines that will respond to developer's needs and accomplish a net gain in wetland resources.

Categorization

Classification and categorization are useful tools in ordering chaos. Wetland classification represents wetland groupings on hydrologic, biologic, and edaphic characteristics. Categorization implies grouping wetlands with a similar value regime, though value is not inherent. Value has socio-economic implications beyond an assessment of presence or absence of wetland functions, or quantitative measurements. Valuation also is a function of time because societal values change, and because wetlands are dynamic ecosystems undergoing seasonal and annual change as well as successive change over time. Time, techniques, and location of data collection can have substantial influence on the result of a one-time evaluation.

A method of evaluating wetlands to determine the appropriate category for each wetland must be a key element of any categorization proposal. However, none of the existing evaluation regimes (technical assessment tools) is adequate to measure the value of each function performed by the many types of natural wetlands in the United States. Evaluation and categorization with existing methodologies would result in irretrievable harm to wetland and wildlife resources.

Potential costs of assessing functions of individual wetlands are high, but careful study is a pre-requisite to designing appropriate management programs. Wetlands provide important functions in maintaining water quality, reducing flood damage, and conserving biological diversity, and their management requires an appropriate public investment in data collection and assessment.

The Wildlife Society is concerned that certain proposals for categorization do not distinguish among several functions of wetlands, and lump values such as flood control and wildlife habitat with different biological and physical attributes, into a few simple "value" classes or fail to distinguish between regional differences. Some categorization proposals have a strong element of triage, assigning wetlands to high (Type A), medium (Type B) and low value (Type C) categories. The Wildlife Society is concerned that wetlands in the low value category would receive less protection than they are provided currently if these categorization proposals are implemented. Further, categorization proposals allow for valuation and categorization by non-wetland professionals (i.e. developers, architects, or engineers) that are not trained to perform these duties.

Because poor scientific understanding of wetlands has contributed to conflicting attitudes and ambiguous approaches, major new initiatives must be undertaken. **This will require substantial funding from public and private partnerships to develop adequate knowledge upon which appropriate policies and regulations will be founded.** High priority must be given to funding research to develop an objective, quantitative, evaluation process that can be coupled with the National Wetlands Inventory. Similar research is needed urgently to improve methods to create compensatory wetlands that replace important wetland form and function.

INTRODUCTION

Natural wetlands once occupied 11% of the 48 contiguous states, but now occur on only 5% - a loss of over 50%. Approximately 75% of wetlands are located on private lands creating unique conservation concerns and opportunities. Wetlands represent a very small fraction of the total land area of the United States, but they harbor an unusually large percentage of the nation's wildlife. For example, 900 species of wildlife in the United States require wetland habitats at some stage in their life cycle, with an even greater number using wetlands periodically. Representatives from almost all avian groups use wetland to some extent and one-third of North American bird species rely directly on wetlands for some resource (Feierabend 1989).

Between the mid-1950s and mid-1970s, approximately 700 square miles of wetland were altered and drained nationwide each year according to the National Wetlands Inventory status and trends reports. While losses were nationwide, most were lost from the upper midwest (prairie potholes) and the south (forested riparian wetland). Nineteen states lost over 50% of their wetlands and Ohio and California lost over 90%. A second status and trends report for the mid-1970s to the mid-1980s found a significant reduction in the loss rate, but losses continued at 300 square miles per year (Dahl and Johnson 1990). During this period the largest losses occurred in the south (primarily forested, but also coastal wetland). Most wetland losses were caused or induced by human activities.

The last 20 years have witnessed an astonishingly rapid reversal of public attitudes and policy towards wetlands. For over 100 years, public attitudes embodied in consensus policy, considered wetlands as "wastelands" and encouraged wetland destruction and conversion with financial incentives. But in the 1960s, Massachusetts passed legislation requiring a state permit for any wetland alteration and many other states followed. On the national scale, growing public awareness of wetland values led to consideration of wetlands in the 1972 Clean Water Act (CWA), followed by the 1977 Executive Order that applied to actions of Federal agencies. This Executive Order, however, led to modifications in the U.S. Army Corps of Engineers (COE) regulations implementing Section 404 of the CWA, (see Appendix A). Later, a number of states implemented wetland regulations. Unfortunately, none of these regulations represents a clearly defined national policy; hence, the confusion, controversy, costs, and disenchantment by many with present approaches. In contrast to wetland drainage, a codified wetland protection/management policy has not been developed.

Reversing the drainage/conversion policy probably could not have been accomplished 20-30 years ago, but increasing public awareness and support are the basis for present concern over wetlands protection and the controversy surrounding wetland regulations. **Resolution of the present controversy concerning wetland protection is possible only through adequate public discussion leading to consensus establishment of a national policy on wetland protection/management embodied in national legislation and unified implementing regulations.** Anything less will perpetuate the current controversy and eventually undermine future support for wetland protection. The U.S. needs a broad national policy that addresses regulations and financial incentives to reduce wetland loss, protect wetlands through public and private ownership, restore drained or altered wetlands, and enhances wetland functions. Only a national wetland policy that repudiates previous conversion policies and encourages/compels wetland protection/restoration/creation/management will reverse continuing losses while accommodating desirable economic development.

The enormous historical losses of natural wetlands in the U.S. and the importance and wide array of wetland functions and their inherent values to society mandates more than a national policy of NO NET LOSS of wetlands. A wetlands policy of NET GAIN or NET RECOVERY must be implemented until such time as the combined wetland resource approximates 75% of the original base. Since the present base is approximately 50% of the original, this will require restoring 25% of the natural wetland acreage, and likely will require considerable wetland creation because many former wetlands will be costly to restore. Diminished populations of many wildlife species are inextricably dependent on wetlands and are unlikely to be restored without enlarging a significant portion of the wetland habitats they require.

Natural wetlands are an ephemeral component of the landscape that largely result from geological incidents and to a lesser extent, from biological and human activities. Specific location, type, and size of every wetland is dependent on a series of geophysical

phenomena that create and maintain suitable hydrological and edaphic conditions at that site. Consequently, attempts to preserve every wetland or even to require on-site replacement are, in fact, attempts to maintain the status quo and disregard the series of unintentional events that create and maintain a wetland on that specific site. This philosophy is inherent in rigid application of in-kind (mitigating a wetland with one of the same type), on-site (mitigating a wetland in the same area) restoration/creation requirements of the COE/Environmental Protection Agency (EPA) Memoranda of Agreement on mitigation signed in January 1990. In contrast, a strategic, landscape approach might well identify more suitable locations of wetlands. In addition, this approach may allow for the creation of a different wetland type or size so as to enhance one or more of the functional values to society.

Unfortunately, fear of change has obscured serious consideration of arguments for strategic landscape planning for wetland management that might increase the values of wetland through judicious location. Fear of change also has inhibited restoration of wetlands to their original form and function, especially in the coastal regions where freshwater marshes have become saltwater marshes after the intra-coastal and associated canals permitted extensive salt water intrusion. For example, in Texaco's Bessy Height's field near Port Arthur, Texas, freshwater cypress stumps are still prominent in a saltwater marsh, but the regulatory process discourages efforts to restore the original freshwater marshes. Required permitting contravenes the goal of restoring freshwater wetlands on sites where those wetlands previously existed despite the fact that salt water intrusion resulted from man-induced and not natural changes. Rigid attempts to maintain the status quo totally disregard historical conditions and anthropogenic effects, as well as the ever changing, dynamic nature of all wetlands.

Wetland interactions and interdependencies in a watershed negate management approaches based on evaluating potential impacts to discrete wetland units. Current site-specific approaches, especially regulatory measures, to wetland resources management are inadequate to conserve or restore wetland and wildlife resources. **Natural wetlands are interdependent and interact with terrestrial components of the landscape and with other wetlands, especially within a watershed or biotic region, such that meaningful management must incorporate a landscape, watershed, or biotic region approach.** Because of these strong interactions and interdependencies, it is not possible to evaluate, assess, or categorize a wetland unit in isolation from other components in the watershed or biotic region. Wetland management also must include temporal and spatial factors since age/successional stage and geographical location strongly influence both form and function of wetland resources. For example, small isolated wetlands strategically located throughout a watershed may have considerably more value in terms of flood amelioration and water quality improvement than a single, large wetland even if it is located at the lower end of the watershed. Relatively narrow bands of riparian vegetation may have inordinate importance as travel lanes for some wildlife species. Consequently, wetland resource management must include the context of the surroundings on a watershed, landscape, or biogeographical unit basis.

In recognizing the complex of hydrologic, biologic, and edaphic components and processes that combine to create and maintain viable wetland ecosystems, **The Wildlife Society recommends that management efforts and programs employ multi-disciplinary and system analysis approaches to ensure adequate representation and evaluation of all aspects of wetland ecosystems. Managers also must incorporate cumulative/multiple impact assessments to wetland resources (and other natural resources) within a hydro/bio/geographical unit since loss or damage to a single wetland could have serious repercussions to the functional values of remaining wetlands (and other resources) within the unit.**

Because of the wide distribution and permeating impacts on public health, safety, and welfare, wetland management also must adopt an international approach in developing a basic philosophy to reverse the loss of wetlands and encourage restoration and replacement of previously lost wetlands throughout the world.

The Wildlife Society recommends that wetlands protective legislation should base permit decisions on whether or not society can afford to lose a wetland, rather than whether or not a wetland can be replaced. This is an extension and endorsement of the philosophy of:

1) encouraging wetland restoration whenever and wherever feasible and practical;
2) avoiding further loss or degradation of wetland resources;

3) minimizing detrimental impacts to wetland form and function when avoidance is not feasible or practical; and
4) compensating detrimental impacts to wetland form and function when those occur.

Wetland resource management must employ these approaches in descending order of priority (i.e. compensatory impact mitigation is the last resort, to be implemented only when avoidance and minimization of impacts are not feasible or practical). Restoration or creation must not be used to mitigate avoidable destruction unless it has been thoroughly demonstrated that the replacement wetlands have equal or better form and function.

Because a majority of wetlands are found on private property, actions taken to protect the public interest also must respect private rights. While much of this discussion revolves around regulation, the full range of incentive opportunities must be examined to encourage not only protection of existing wetlands, but to reverse the loss trend so wetland acreage is increased.

Where compensatory mitigation is required, acquisition and restoration of previous or degraded wetlands should take precedence over attempts at creating new wetlands because of the poor history of many creation projects. Certain types of wetlands may be created relatively easily, but knowledge of many other wetland types is inadequate and numerous attempts to create these wetlands have been less than successful. While many projects failed due to the lack or poor application of existing knowledge (Erwin 1991, Landin 1992), other failures were related to overly ambitious goals or objectives, unrealistic time frames, and/or inadequate resources. **However, even successful creation projects require continued maintenance/management for the foreseeable future. Unless responsibilities and resources are funded by long-term financial commitments, the end result may not be viable wetland ecosystems.**

Changes in society's attitudes towards wetlands resulted from educating the public on wetland's worth (i.e. the quantitative and qualitative benefits that society derives simply because the wetland exists in that location). Benefits that result from the processes or functions carried out by wetlands also have significant values. To create a direct linkage between wetland functions and value to society, **functional values** are defined as: **those products and effects resulting from the natural processes and functions of a wetland that have economic, educational, recreational, and social impacts (positive and negative) on various segments of society.**

Poor scientific understanding of wetlands and their functional values is an important contributing factor to conflicting attitudes and ambiguous approaches to wetland mitigation. **The Wildlife Society believes that major new initiatives must be undertaken, requiring substantial funding from public and private partnerships, to develop adequate knowledge for use in adopting appropriate policies and regulations.** We reject arguments that it would be too costly to identify, classify, and categorize all wetlands to implement wetland management policies. A complete understanding of all the functional values for each and every wetland, regardless of size, is unnecessary. Nonetheless, the present knowledge base is insufficient to evaluate important functional values for major wetland types or to designate major interchange relationships between wetlands and terrestrial regions within the landscape. Scientists lack the essential ability to identify, describe, evaluate, and place wetlands in the landscape. However, this need not delay development of a national policy on wetlands management and protection, although it likely will be required to fully implement subsequent regulations.

Previous failures to provide adequate funding for wetland inventory and research have been costly to society due to extensive loss of wetland functional values and their subsequent economic benefits. For example, rural nonpoint source pollution is frequently cited as the largest remaining contributor to water quality problems, and improper resource management is identified as the culprit. Doubtless, poor land management is a factor, but rural land management is generally better today than 50 years ago when water pollution was less severe. Recently we have learned that 10-20 acres of constructed wetland can provide high level treatment for municipal wastewaters from 1000 residents for 10-50% of the $3-4 million costs of conventional treatment systems (Hammer 1991). How much was the natural wetland worth before it was destroyed? Despite a much larger percentage of rural land being covered with vegetation, 100 year floods seem to occur at 10 or even 5 year intervals . Overharvest has been important in the depletion of fishery stocks, but what portion of the loss is due to lost wetland nurseries? The critical element may well be natural wetlands, that previously protected society from flooding and water contamination and provided the foundation for larger fish/food populations. Loss of

natural wetlands is costly to society and attempts to recover significant benefits depend on an adequate understanding of wetlands, their functional values, and their importance in the landscape.

Recovering financial losses to society caused by previous costly subsidies supporting drainage/conversion programs requires significant increases in funding for the following:

1) research on functional values, including economic benefits;
2) landscape relationships and interactions of wetlands;
3) inventory;
4) classification and categorization; and
5) wetland restoration/creation methods.

MITIGATION

Despite society's desire to protect remaining wetland resources through positive efforts to avoid and minimize wetland impacts, certain types of developments often are impossible without detrimentally impacting on-site wetlands. Therefore, protective regulations should require compensatory mitigation of wetland impacts in cases where wetlands will inevitably be impacted if the proposed development is approved. Under current regulatory requirements, compensatory mitigation must occur only after avoidance and minimization of impacts have been attempted. In its simplest form, compensatory mitigation allows the regulatory agency to say "yes" to development with a series of requirements. In that sense, mitigation is a tool that expands the regulators role from a simple "yes" or "no" to one of negotiated development. However, compensatory mitigation is only applicable within the prescribed wetland regulatory process; at present non-regulatory wetlands (those built for other than mitigation purposes) account for 99% of all wetlands restored and created (Landin 1992). Mitigation is NOT the cure to the wetland loss problem, but only one of many tools to protect/manage wetland resources.

Due to the broad scope and many interpretations of the term, The Wildlife Society defines **mitigation** as: **replacement of the form and function of the wetland that will be impacted detrimentally.**

This definition deliberately excludes the concept of minimizing harm from mitigation, although this often is included in other definitions. It also deliberately avoids specifying locations, sizes, creation, restoration, enhancement, etc. because full replacement may be accomplished through a variety of means.

Including "function" in the above definition is important because current mitigation is based largely on replacement of wetland form (i.e. the physical components of the impacted wetland). Replacement of major components may or may not replace all wetland functions and depends upon the specific wetland functions, wetland form, and spatial and temporal locations. However, given this definition of mitigation, the viability of the basic approach to replacement must be examined. Since mitigation assumes that the form and functions of the wetland can be replaced, a review of wetland functions is needed.

Functional values of natural wetlands that are important to society include: ground-water recharge, ground-water discharge, floodwater alteration, sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, production export, aquatic and wildlife diversity/abundance, storm buffering, recreation, and uniqueness/heritage (Adamus et al. 1991).

This list may be grouped into four major categories:

1) life support;
2) hydrologic buffering;
3) water quality improvements; and
4) historical/cultural significance.

Because wetland functions are controlled by physical, chemical, and biological processes, wetland functions are related strongly to complexity, degree of alteration (pristine, unchanged), size, and location of the wetland as illustrated in Table 1.

Life support is largely a biological function, although it depends on physical and chemical processes. This function has moderate site dependency with moderate to high size, complexity, and pristine dependency. It includes production and maintenance of flora and fauna -- forbs, grasses, shrubs, trees, fungi, invertebrates, birds, mammals, fishes, reptiles, and amphibians -- that are valued for commercial products and recreation.

Hydrologic buffering is largely a physical function that is extremely site dependent and highly size related. It

Table 1. Physical/spatial attributes of wetland functional values.

Wetland Functions	Complexity	Pristine	Size	Location
Life Support	High	High	High	Mod
Hydrologic Buffering	Low	Low	Mod	High
Water Quality Improvements	Low	Low	Mod	High
Historical/Cultural	Low	High	Mod	High

includes flood amelioration such as flood water storage/ retention (i.e. desynchronization and reductions in magnitude of downstream flows reducing flood water damages during unusual storm events). Conversely, delayed discharges of flood waters augment base flows in rivers and streams supporting diverse aquatic life in waterways. In some instances wetlands can have an important groundwater recharge function to increase total ground water resources. Natural wetlands that protect and are supported by groundwater discharge can provide important surface water sources. Also, some wetlands have essentially flow-through groundwater patterns (Clark and Benforado 1981, Gosselink et al. 1990, Gosselink and Turner 1978).

In the water quality improvement function, chemical and physical processes tend to dominate biological processes. This function has high site dependency and lower size, complexity, and pristine dependency. It includes removal of pollutants/contaminants from inflowing waters -- principally surface flows, but also some subsurface inflows -- to purify natural water supplies. Principal actions (Faulkner and Richardson 1989) include:

1) chemical - oxidation, reduction, cation exchange, adsorption, precipitation;
2) physical - sedimentation, filtration, precipitation; and
3) biological - microbially mediated reactions, assimilation/uptake, nutrient recycling.

The historical/cultural significance function is highly site specific and strongly related to natural condition, but only moderately related to wetland size and complexity. It includes preservation of anthropological and historical resources.

Physical and chemical processes are much less dependent than biological processes upon complex, diverse, and perhaps pristine wetlands. A very simple or severely degraded system may have an important hydrologic buffering value and/or water quality improvement value, but little or no life support value. Generally, life support values increase with increasing complexity and proximity to natural conditions. However, a simple wetland (low diversity/complexity) can have very high productivity for certain products. A small system (perhaps 0.1 ha) may have important water quality improvement values, but little or no flood amelioration or life support value. Exceptions include very small systems that provide habitat for unusual, threatened, or endangered species. Moderate size (>2 ha) systems may have significant hydrologic and life support values and increasing size is related to increasing importance for these values. Location in the watershed is extremely important to the hydrologic buffering function and moderately important to water quality, but may be much less important to the life support function. However, location in a state, region, country, or continent may be quite important to the life support function.

Numerous compensatory mitigation projects have failed, and these failures are commonly cited as reasons to deny the concept's validity. Given the broad variety of wetland types, their geographic distribution, and diverse nature of wetland functional values, generalizations are not possible. This is especially true for smaller wetlands and unique types with isolated distributions. Furthermore, the interrelationships of wetland units within a geographic area and their interdependencies on associated terrestrial environments, make replacement evaluations difficult. However, certain types of wetland have been restored, enhanced, and/or created for many years. A considerable body of knowledge exists on restoration, enhancement, creation, and management of marshes -- especially the Prairie Potholes and other midwestern marshes (Sewell and Higgins 1991, Galatowitsch 1993, Delphey and Dinsmore 1993).

Similar, though less extensive, information is available for freshwater marshes in the interior valley of California and the Intermountain West, and coastal marshes along the Atlantic and Gulf coasts. Some information is available for northern bogs, less for Coastal Plain bogs, and very little for high elevation bogs. Information on forested riparian wetlands, especially the great river swamps of the Southeast, is rudimentary and almost non-existent for unique systems such as pocosins (Bridgham and Richardson 1993), vernal pools, riparian bands, and Carolina Bays.

Similarly, the information base on mitigating wetland functional values varies considerably. The ability exists to accomplish certain life support functions (e.g. waterfowl, wetland mammal, fish and timber production [Crawford and Rossiter 1982, Rossiter and Crawford 1981, Kreil and Crawford 1986]), but only limited information exists on the host of other biological products derived from wetlands. Very few investigations have explored the hydrologic buffering functions and results have been mixed. The water quality improvement function has received considerable attention within the last few years, although much of the information was derived from deliberately constructed wetlands. The extent to which this information can be extrapolated to natural wetlands is unknown. Consequently, the ability to replace functional values is limited because of a poor understanding of these functions. The state of the art for functional values is inadequate to enable scientists to replace these functions in most newly created wetlands.

Further, the meager existing information often is not used in restoration, enhancement, and creation projects. Failure of many projects lies with the lack of, or improper application of, existing knowledge rather than due to faulty science. **Too few developers employ experienced biologists in the design, construction, and operation of wetland projects and subsequent failures are predictable.**

Compensatory mitigation projects that attempt to create new wetlands demonstrate widely varying success rates. Therefore, **regulatory agencies should require natural wetland restoration or enhancement for mitigation rather than new wetland creation.** In many cases, restoration of damaged or degraded wetland is much more likely to succeed than attempts to create a wetland in a formerly terrestrial environment. The residual hydrology, edaphic, and biological components in the previous wetland make it possible to restore the wetland simply by removing or modifying the factors causing degradation.

In situations where restoration or enhancement is not feasible, mitigation in the form of created wetland may be acceptable if:

1) **documentation is available on the success of projects creating similar types of wetland in that region; or**
2) **the permittee provides funding for research on similar natural wetlands in the region that would identify means by which the form and function of the impacted wetland could be duplicated in a newly created wetland; and**
3) **the permittee ensures that development of the new wetland is conducted under the direction of competent biologists employing current information or information obtained from studies on the model natural wetland; and**
4) **the permittee agrees to provide for long-term monitoring to ensure the new wetland is functional and self-perpetuating; and**
5) **the permittee agrees to provide long-term financial support through an irrevocable trust to ensure funding for necessary management.**

Although various agencies and individual offices of agencies have developed size replacement requirements, most appear to be attempts to establish a relationship with replacement of wetland form. Replacement of functions for an individual wetland often require the replaced wetland to be larger than the wetland being replaced, depending upon functions and replacement time period.

MITIGATION BANKING

The complex web of regulations and the inability of some developments to avoid detrimentally impacting wetlands has led to the concept of replacing wetlands in various forms or systems. Costs for complying with current regulations and uncertainties over permit delays have encouraged proposals for establishing banks of protected/restored/created wetlands that could facilitate compliance with the replacement requirements. In a further attempt to expedite regulatory reviews, various groups have proposed establishing specific areas where wetlands are protected/restored/created and cooperating

parties could receive "credits" for wetlands in the bank that would be used to offset their liability for detrimentally impacting a wetland in a new development.

Wetland mitigation banks, herein, are defined as: **the accounting procedure used to determine the wetland acreages lost, protected, restored, or created including credits and debits of various accounts.** Wetlands banks sometimes also include the physical area (land base) in which wetlands are protected/ restored/created as well as the organization responsible for development and management.

Wetland mitigation banking is defined as: **the philosophy and process through which negotiated development and permit approvals result in acquisition and protection or restoration of natural wetlands, creation of wetlands, and the accounting procedure by which losses or gains are recorded and monitored.**

Developers are leading advocates of wetland mitigation banking because they often are caught in a confusing web of unknowns related to potentially impacting a wetland as part of their overall development proposal. Many developers seek a simplified solution, asking that they be told what it will cost and when a permit will be issued so they can factor the delay and cost into their project planning.

However, current delays and lengthy regulatory processes reflect:

1) the complexity of wetlands and the inability to adequately evaluate functional values and ensure replacement of form and function through mitigation; and
2) the inability of regulatory agencies to agree on and implement standardized permit processing procedures.

Present regulatory difficulties serve neither to protect all wetlands and their functional values nor to accommodate economic development in an orderly, cost-effective manner. Some say that the current regulatory approach fails to provide adequate protection, while others fault costly delays and the inability to plan developments. Others cite the continued loss of wetlands as a failure to implement a no-net loss policy on a local, regional, state, or national basis, and the inability to restore wetlands and their functional values. Many examples of disparate implementation of regulations also have been articulated. Forceful arguments can be made for both sides of the issue. The present controversy regarding wetland protection is not surprising given the short time period for an almost complete reversal of a long established drainage policy. However, poor scientific understanding of wetlands also has been a contributing factor.

Monetary factors strongly influence mitigation banking proponents, but economics is part of all natural resources management and is certainly no reason to oppose the concept of wetland mitigation banks. Furthermore, opposition is no longer timely. Wetland mitigation banks and banking programs are increasing almost exponentially and developers are leading the efforts while conservationists often find themselves in opposition. A progress report on mitigation banking (USA COE IWR 1992) shows that existing banks increased from 13 in 1988 to 20 in 1991 to 37 1992. In addition, 64 planned banks were expected to become active in 1992. Of the existing banks, 38% are on the west coast, 27% in the northern plains, and 16% in each of the mid-Atlantic and Gulf regions. Highway construction projects were involved in 60% of the banks; port (14%) and industrial development (11%) were the next most common. States exclusively own 50% of the banks, 20% are privately owned, and local public bodies and federal ownership account for another 20%. The largest was 7000 acres but only 15% were >640 acres, while 51% were >40 acres and only 5% were <10 acres.

The relevant questions now are: what impact do wetland mitigation banks have on wetland and wildlife resources and can current rigid regulatory applications be modified to achieve the goals of minimizing loss and maintaining and restoring wetland functions? Is a better quality management achieved for wetland resources within the structure of wetland mitigation banking than without it? A mitigation bank, in its usual form, gambles that focusing efforts on fewer and more significant wetlands will have positive results for the landscape, even though other wetlands may be lost.

The effects of mitigation banking on wildlife, wetlands, and society have positive and negative aspects. Wetland mitigation banking pluses include:

1) alternatives for improving quantity of high quality wetlands as well as acquisition and management opportunities;
2) opportunities for restoration of degraded wetlands;
3) increased diversity and isolation for wildlife species;

4) scale, size, and location improvements if regulators and developers are required to employ a landscape approach;
5) protection of existing habitats through acquisition and management;
6) better adherence to fish and wildlife needs;
7) exploits new management opportunities and approaches;
8) potential for a net gain of wetland if creation is successful;
9) better technical and professional expertise are likely to be available on larger projects;
10) greater involvement and possible cash flow for owners of lands that now have little market value;
11) facilitates conflict resolution;
12) reduced delays encountered by developers; could provide clear direction to developers and enhance their ability to estimate total project costs; gives developers a degree of certainty in terms of permit approvals and timing so they can deal with banks, other funding sources, and planning agencies; could be seen as positive effort by conservationists to work with developers; and could positively influence developers attitudes towards wetlands and wildlife in general;
13) could create greater acceptance and understanding in the regulated community of wetland functions and values that might encourage deliberate use of created/constructed wetlands in development projects.

Negative effects of wetland mitigation banking include:

1) converting to wetlands can cause loss of other habitats, especially certain terrestrial habitats;
2) influencing the natural distribution of wetlands;
3) altering types of wetlands;
4) altering functions of wetlands;
5) impacting size (including sacrificing many small wetlands for one large wetland);
6) increasing regulatory requirements;
7) potential losses of wetland since enforcement in mitigation banks has been poor or lacking;
8) potential losses due to lack of long-term funding. Many projects lack provisions for management and funding in perpetuity; can guaranteed, long-term funding be provided and who will be responsible for long-term management?

The Wildlife Society urges wildlife scientists and managers to initiate a proactive approach to mitigation and wetland mitigation banking. In addition, managers must develop guidelines for mitigation and mitigation banks that will respond to the needs of developers and accomplish a net gain in wetland resources. Developing and promoting a program/policy to enhance the positive resource aspects of banking while reducing the negative wetland impacts and improving regulatory conditions for developers could become a win-win situation. However, the policy must increase wetland form and functional values and concurrently reduce and standardize regulatory requirements. The Institute of Water Resources survey (USA COE IWR 1992) currently underway likely will provide additional information concerning the creation of a new policy. However, in the interim, a wetland mitigation banking policy should include:

1) national guidelines and oversight as part of a national wetland policy;
2) regional modifications/specifics;
3) state or regional decision making and implementation;
4) administration by joint private/state/federal consortia established for that specific purpose. Mitigation banks must be established and managed by cooperative agreements among various organizations and not necessarily controlled by government agencies. COE and EPA are unlikely to actually manage banks, but only will regulate them. On the other hand, many existing private organizations could provide long-term management and new consortia of private and governmental organizations could be established for the specific purpose of providing funding and management in perpetuity. A means to provide for permanent protection and management of all wetlands in mitigation banks must be developed;
5) ecological equivalency as a specific goal of compensatory mitigation including replacement/increase of form and functions;
6) landscape, watershed, and hydrological/biological/geographical evaluations of compensatory mitigation;
7) general guidelines on within-kind vs out-of-kind, within-site vs off-site, near- or far-site, in- or out-of biotic/hydrologic/geographic region that are designed to increase the acreages, form and functional values of wetland that will be refined at state or regional levels;
8) establishment of escrow/trust funds or other means to ensure funding for full implementation and long term management; funding of the mitigation bank must not be susceptible to company failure/bankruptcy or re-organization;
9) improved methods/means to provide, record, and monitor mitigation credit, including guidelines for third party brokering of mitigation credits;

10) less regulatory attention to a permit that leads to a decision to develop a wetland with certain mitigation stipulations, and more follow-up on what was actually done. Federal agencies have done a poor job of monitoring wetland permit compliance after granting a permit;
11) reduced regulatory requirements to improve opportunities for net gain to wetlands and wetland resources;
12) requirements for incorporation of wetland science with careful, conscientious planning and construction for any mitigation project to reduce poor planning and execution;
13) requirements that mitigation is in place and functioning, concurrent or a priori other aspects of the project. Current regulations largely are tied to the same time line as the developer's project. Regulations must have the flexibility to allow for accumulation of mitigation credits in banks prior to and/or concurrent with loss of the natural wetland. In too many instances, developer's cash flow problems have caused mitigation failures. In other cases, a priori mitigation may be necessary to ensure that mitigation projects will succeed before the development is initiated.
14) guidelines on locations, type, size, and establishment of mitigation banks including how form/function are established/accepted in the banks;
15) clear, quantifiable goals that have measurable outputs for each of the mitigation banks;
16) a monitoring and evaluation plan and funding to achieve that plan for each mitigation bank plan and program;
17) mitigation banking credits that are not transferable from one project to another without adequate evaluation by qualified professionals;
18) recognition that education is an important goal of mitigation not only for the public, but for specific user groups and resource managers. It is important to recognize that wetlands not only are important in terms of wildlife, but also for many other functional values.

Present regulations may contravene society's goals for wetlands in some instances and need to have more latitude to encourage and support wetland restoration/creation projects by various organizations on private and public lands. Increased regulatory flexibility must include proactive acquisition and long-term management if compensatory mitigation and wetland mitigation banking are to protect and restore wetland resources.

An example of an active mitigation banking scheme -- North Dakota's no net loss of wetland law -- is described in Appendix B. (This does not imply endorsement by The Wildlife Society nor is it an attempt to propose this law as a model.)

CATEGORIZATION

Classification and categorization are useful tools in ordering chaos whether the subjects are insects, stamps, job descriptions, or wetlands. Wetland classification is generally understood to represent groupings of wetlands based on similar hydrologic, biologic, and edaphic characteristics without any attempt to include a value judgment on one group or another. Categorization, however, implies grouping wetlands based on some form of assigned value regime.

Valuation or determining/assigning values must include by whom, for whom, and for what purpose. The value of something is determined by society and is not an inherent characteristic (i.e. the function of flood abatement for a specific wetland could have significant value to a downstream community yet lack any value to an upstream community). Value has socio-economic implications that go far beyond an assessment of presence or absence of wetland functions, or even quantitative measurements. In addition, the value of a function may change over time as society's values change. Therefore the same wetland could have a different perceived value by the same society at a different point in time.

The Wildlife Society recognizes the importance of evaluation of natural resources as an important basis for making decisions concerning land use. Mapping and scientific assessment of soils and forest stands has long been recognized as essential to prudent management of agricultural and forest resources. Likewise, wetland resources must have a similar level of assessment. However, hasty legislation to lump wetlands into categories without a sound scientific base will put health, safety, and welfare at unwarranted risk.

Scientists regularly put wetlands and other resources in different categories for management and protection without altering the effectiveness of management programs. For example, EPA makes advance designation of wetlands under the Section 404 program, and the Fish and Wildlife Service designates wetlands for the RAMSAR Convention list of Wetlands of

International Importance and has identified high priority wetlands for each region of the country. Biosphere Reserves and Natural Heritage Sites are other well recognized categories that do not change the value of the basic resource.

The Wildlife Society recognizes that wetland regulatory agencies already are engaged in wetland valuation as they decide the necessary level of review for permits (i.e. a desk review or field investigation and expert consultants). However, in many cases, the basis for this decision is not clear or available to the permit applicant. Some agencies make these assessments in advance of the permit process. The COE and EPA make advance designations to advise the public that certain wetland complexes will require more rigorous review. New Hampshire and Connecticut have adopted manuals to guide in identifying prime wetlands that will require higher levels of review.

A key element of categorization proposals must be a means of evaluating wetlands to determine the appropriate category for each individual wetland. The Wildlife Society is familiar with widely used evaluation methods (Wetlands Evaluation Technique - WET, Habitat Evaluation Procedure - HEP, etc.), most of which are technical assessment tools (see Appendix C). The Wildlife Society does not believe that any existing evaluation regime is adequate to measure the true value of each function performed by the many types of natural wetlands. Consequently, any attempt to evaluate and categorize natural wetlands with existing methodologies will result in irretrievable harm to wetland and wildlife resources. Unfortunately, evaluation using current methods is largely subjective, or it requires detailed and costly investigations that attempt to characterize form and function of an individual wetland system. In too many cases, cursory evaluations are overly dependent upon a few highly regarded functional values, with little regard for encompassing the sum of the many functional values from a small isolated wetland, or larger, multiple wetland units. Consequently, present valuation methods often underestimate the value of even the highest priority wetland and fail to produce a realistic value for lesser wetland systems. The latter likely would include smaller systems, isolated/disjunct systems, disturbed or degraded systems, drier-end wetlands or transitional zones of wetlands, and ephemeral wetlands. Many of these could have significant, but unmeasured, functional values.

With a few exceptions, scientists lack quantitative data on many functions in most types of natural wetlands. The exceptions (mostly in fresh or salt water marshes) include components of the life support function (i.e. production of avian and mammalian fauna, finfish, shellfish, plants, and isolated cases of water purification). For the vast majority of wetland types, scientists lack quantitative information on the biological productivity and other important functional values.

Historically, wetlands were grossly undervalued, but later organized waterfowl hunters led efforts to protect and preserve certain types of wetlands. Recently, other life support functions along with hydrologic buffering and water quality improvement were identified as significant values. Major segments of society now place high value on wetlands and government policy is to protect rather than destroy remaining wetlands. A complete reversal in society's valuation of wetlands has occurred in less than 60 years, with the most significant change taking place within the last 20 years. It is difficult to estimate which functional values of wetlands will be important to society in the 21st century. If valuation schemes are employed to categorize wetlands with certain categories receiving little or no protection, evaluators must have the ability to estimate future values as well as adequately assess present values of existing wetlands. Lacking an estimate or assumption of future values, evaluators could easily under-rate a significant portion of existing wetland resources, resulting in the loss of that segment before it has been evaluated under the standards of a future society. It does not appear likely that a significant new category of functional value will emerge from future investigations. However, it's possible that additional functions and values will be identified or a complete reordering of priorities will occur with further understanding of "low" value wetland systems.

Furthermore, evaluation of a wetland is inevitably related to time of year and age of the system. Wetlands are dynamic ecosystems undergoing considerable seasonal and annual change as well as successive change over time. Time, techniques, and location of data collection can have substantial impact on the result of a one-time evaluation.

While wetland science is limited in its ability to provide quick and inexpensive methods of quantifying all wetland functions, several means to predict wetland functions are available and being improved. The general functions of wetlands within regions of the U.S. and within local landscapes (i.e. bottomland hardwoods, estuaries) are well known. There is no reason for urban development, agriculture, forestry, transportation, and other land use programs to fail to use current

knowledge and assessment techniques to identify potential consequences of wetland loss. The intent should be to avoid wetland loss and to reduce impacts to wetlands that must be altered. The Wildlife Society concludes that much of the past and current loss of wetlands, and the current controversy in the policy arena, is exacerbated by single-sector, land-use decisions that have not made use of available information on wetland functions and assessment techniques (Atkinson et al. 1993).

Project siting is a critical element in assessment of wetland functions. Placing monetary values on wetlands requires an economic assessment that is sensitive to the land values and economy of the project locale. There are potential costs of assessing the functions of individual wetlands; however, other disciplines require careful study before implementing land use plans. For example, careful and costly study of watersheds is a pre-requisite to designing flood protection programs. Farming practices are guided by professional surveys of regional and individual farm soil conditions. Forest management plans are based on detailed studies of stand composition, volume, and growth. Wetlands must be included similarly in comprehensive watershed planning and analyses.

To the extent that wetlands are providing important functions in maintaining water quality, reducing flood damage, and conserving biological diversity, their management requires an appropriate public investment in data collection and functional assessment. Costs for these efforts can be contained if the functions of wetlands are given due consideration and incorporated into current and future publicly funded flood control, water quality, soil and forest survey, and natural heritage programs. Part of the reason that the United States has experienced massive loss of wetlands is that their functions and limitations have been poorly understood by engineers and agricultural land managers.

Individuals who would develop or drain wetlands often search for a simple value system that requires no biological expertise and limited data collection or technical review. The Wildlife Society is concerned that some categorization proposals would allow for categorization by non-wetland professionals (i.e. developers, architects, or engineers) that are not trained to evaluate wetlands or wetland functional values.

The Wildlife Society advocates expanded use of planning level assessment by state and federal agencies for the purpose of:

1) **improving and standardizing the application of current knowledge that is applicable to wetland evaluation;**
2) **encouraging a multi-disciplinary approach to wetland evaluation;**
3) **encouraging a systems approach to wetland evaluation;**
4) **improving agency consistency in the wetland permit review process; and**
5) **providing advance warning to the regulated community of wetland areas that will require more than a basic level of review.**

The Wildlife Society is concerned that certain proposals for categorization for regulatory protection purposes do not distinguish among the several functions of wetlands. Proposals also lump values, such as flood control and wildlife habitat that have different biological and physical bases, into a few simple "value" classes. Schemes to put wetlands into nation-wide value classes without providing for any process to distinguish among regional differences also are suspect. In addition, some categorization proposals appear to have a strong element of triage by assigning wetlands to high (Type A), medium (Type B) and low value (Type C) categories. The Wildlife Society is concerned that wetlands in the low value category would receive less protection than they currently are provided. Low value wetlands could easily fall under a nationwide permit, allowing their development and subsequent loss when their value is largely unknown.

The Wildlife Society recommends that high priority be given to funding research to develop improved techniques and methodologies to quantify the functional values of wetlands and effects of wetland alterations. This research should develop an objective, quantitative, sound evaluation process that can be coupled with the National Wetlands Inventory and should be accomplished by joint private, state, and federal action. Similar research is needed urgently to improve inadequate methods to create compensatory wetlands that provide all of the identified wetland functions.

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APPENDIX A. HISTORY OF WETLANDS PROTECTION POLICY IN THE UNITED STATES

Legislation

The Water Pollution Control Act of 1948 (PL 80-845) was the first comprehensive statement of federal interest in clean water programs. PL 80-845 also was the first statute to provide state and local governments with partial funding needed to aid in solving their water pollution problems. There were no federally required goals, objectives, limits, or even guidelines prior to PL 80-845. There were no mandatory indicators to determine whether pollution was occurring. Nevertheless, the U.S. Surgeon General was charged with developing comprehensive programs to eliminate or reduce the pollution of interstate waters.

During the latter half of the 1950s and well into the 1960s, water pollution control programs were shaped by four statutes: the Federal Water Pollution Control Act of 1956 (PL 84-660); the 1961 amendments to that Act (PL 87-88); the Water Quality Act of 1965 (PL 89-234); and the Clean Water Restoration Act of 1966 (PL 89-753). All of these statutes dealt largely with federal assistance to and federal enforcement of municipal discharges.

Water quality standards become a prominent feature of the law with the passage of the Water Quality Act of 1965 (PL 89-234). That law created the Federal Water Pollution Control Administration and required the development of state water quality standards for interstate waters.

In 1963, Massachusetts enacted a permit-based wetland regulation program, followed by Rhode Island, Connecticut, and several other northeastern states.

The Federal Water Pollution Control Act Amendments of 1972 (PL-92-500)--as the Clean Water Act is officially titled--was enacted October 18, 1972. Local, state, and national water quality programs since 1972 have been more firmly shaped by the assumptions in PL 92-500 than by any other law; the statute has been amended 12 times.

The 1972 Federal Water Pollution Control Act Amendments added the Section 402 National Pollution Discharge Elimination System permit program, 33 U.S.C. 1344 (1988), to eliminate water quality problems by regulating the discharge of pollutants to the nation's waters.

The Coastal Zone Management Act of 1972 (PL 92-583) required applicants to obtain certification from the appropriate state coastal resources agency which notes that a permitted activity complies with the state's coastal zone management program. The state's program must be approved by the Department of Commerce.

The Water Quality Act of 1987 (PL 100-4) emphasized technology-based standards for industrial dischargers; enhanced enforcement authority with increased civil, criminal, and administrative penalties; and recognized the critical pollution problems of non-point sources.

The federal government has adopted a number of policies aimed at reducing the direct effects of its activities on wetlands. These policies include: the National Environmental Policy Act (PL 91-190), the Fish and Wildlife Coordination Act of 1934 (PL 73-121) as amended (16 USC-662), Executive Order 11990 on the Protection of Wetlands, and the Water Resources Development Act of 1986 (PL 99-662) which includes requirements for mitigation of adverse effects on wetlands. Also important in some coastal areas is the Coastal Barriers Resources Act of 1982 (PL 97-348) which makes new development projects in designated areas ineligible for most federally financed assistance programs.

The Tax Reform Act of 1986 (PL 99-509) eliminated most of the special tax advantages that accrued to farmers and developers for new investments, particularly in wetland areas. The Food Security Act of 1985 (PL 99-198) included a "swampbuster" provision that makes farmers ineligible for agricultural income-support programs if they convert wetlands to farmland. The Coastal Barriers Resources Act (PL 97-348) withdrew all federal subsidies for development on designated coastal barrier islands and beaches where wetlands are a critical feature of the environment.

In 1986, the Congress enacted the Emergency Wetlands Resources Act (PL 99-645) to promote the conservation of wetlands in order to maintain the public benefits they provide, as well as help fulfill international obligations contained in various migratory bird treaties and conventions. The intent was to protect, manage, and conserve wetlands by intensifying cooperative and acquisition efforts among private interests and local, state, and federal governments.

Regulation

The Clean Water Act (CWA) Section 404 permit program regulates the discharge of dredged or fill material into "navigable waters of the United States," which includes adjacent wetlands, 33 U.S.C.1344 (1972). The program is jointly administered and enforced by the U.S. Army Corps of Engineers (COE) and the United States Environmental Protection Agency (EPA). The COE has the primary permit issuance authority, issuing both individual and general permits.

The individual permit process under Section 404(a) requires the COE to apply a broad-based "pubic interest" review test. This test balances a variety of factors ranging from economic to energy considerations. The COE also must ensure that the permit complies with EPA's detailed environmental criteria--the Section 404(b)(1) guidelines, 40 C.F.R.230 (1991).

Section 404(b)(1) of the CWA requires the EPA to establish guidelines that specify where and under what conditions dredged or fill material can be discharge lawfully, 33 U.S.C. 1344 (b)(1). Among the components of the Section 404(b)(1) guidelines is the practical alternatives test which prohibits the discharge of dredged or fill materials to waters of the United States, including wetlands, if there is a "practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, provided that the alternative does not have other, more adverse environmental impacts," 40 C.F.R. 230.10(a) (1991).

Under Section 404(c), Congress granted EPA the right to veto COE permit actions if the discharge would result in "unacceptable" adverse effects on "municipal water supplies, shellfish, fishing areas, wildlife, or recreation areas."

Another avenue for approval of discharges is authorized by Section 404(e), 33 U.S.C. 1344(e) (1972). Here, a proposed discharge may fall under one of 36 general permits.

The federal wetland delineation manual is the COE's primary resource in making wetland determinations. In the 1992 Energy and Water Development Appropriations Act, Congress mandated that the COE use the 1987 manual pending resolution of the proposed changes to the 1989 manual (PL 102-104, 105 Stat. 511) (1991).

Memorandum of Agreement/Executive Order

Memorandum of Agreement (MOA) exists between the Department of Army and the EPA concerning federal enforcement for the Section 404 program of the Clean Water Act (Jan. 19, 1989). Under this accord, the COE retains primary responsibility for matters of jurisdiction in determining whether wetland regulations apply.

The 1990 Memorandum of Agreement (MOA) on mitigation between COE and EPA provides new guidance for wetland mitigation (55 Fed. Reg. 9210) (1990), and is used to determine the type and level of mitigation necessary for compliance with the guidelines. In one of the most significant sections of the MOA, it adopted the Council on Environmental Quality's (CEQ) definition of mitigation, 40 C.F.R. 1508.20 (1991), which is avoiding, minimizing and rectifying impacts, reducing impacts over time, and compensating for impacts, (summarized in the MOA as avoidance, minimization, and compensatory mitigation). The MOA then went further than CEQ by requiring that mitigation measures be applied in the sequence set forth in the CEQ regulation. Finally, the MOA gives wetlands a higher priority than other aquatic areas. The COE agreed that it will seek to achieve a goal of "no overall net loss of values and functions" of wetlands.

Executive Order No. 11990, "Protection of Wetlands," directs each agency to take action "to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." It further directs that work conducted or funded by a federal agency shall "to the extent permitted by law avoid undertaking or

providing assistance for new construction located in wetlands" unless "there is no practicable alternative to such construction" and "the proposed action includes all practicable measures to minimize harm to wetlands." However, this does not apply to private work done under federal permit with no federal funding or assistance.

Executive Order No. 11988, which deals with protection of floodplains, also requires written agency justification for a project proposed to be located in a floodplain; a statement indicating whether the action conforms to applicable state or local floodplain protection standards; and a list of alternatives considered. Unlike Executive Order No. 11990, this one reaches federal permit issuance as well as other federal activities.

Agency Policies

EPA

Section 404 authorizes a special permit program to control dredge and fill operations and names the Secretary of the Army as responsible for issuing such permits. However, the Secretary and the EPA Administrator are jointly responsible for setting the guidelines by which permits are to be judged.

The EPA's guidelines often are considered the driving force in the COE's permit process. These guidelines, which were issued in 1980, state that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem," 40 C.F.R.230.10(a) (1980). The EPA is involved in other important aspects of the 404 permit program including areas that can be listed as suitable disposal sites and prohibiting certain materials from being discharged at approved sites. Permits issued under Section 404 expire after five years.

Under its Section 404(c) authority, 33 U.S.C.1344(c) (1988), EPA must find unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas to substantiate a veto.

The EPA first published rules implementing Section 404(c) on October 9, 1979 -- 7 years after the Act was passed. These rules included reference to a prior set of Section 404(b)(1) guidelines, which set forth not only the criteria for permit issuance by the COE, but also "the substantive criteria by which the acceptability of a proposed discharge is to be judged" for purposes of Section 404(c), 44 Fed. Reg. 58,076 (1979). Late the following year, EPA published new Section 404(b)(1) guidelines without amending its Section 404(c) regulations, 45 Fed. Reg. 85,336 (Dec. 24, 1980). The EPA has since interpreted Section 404(c) and these guidelines to provide a single environmental imperative that is applied only after the COE's "public interest" review has determined that the project is socially beneficial.

Under Section 309(a) of the CWA, the EPA is empowered to issue administrative orders in response to wetland violations, 33 U.S.C. 1319(a) (1986).

Department of the Interior - Fish and Wildlife Service

The Fish & Wildlife Service recognizes the definition of mitigation provided by the CEQ which includes a logical sequence of steps: (1) avoiding the impact, (2) minimizing the impact, (3) rectifying the impact, (4) reducing or eliminating the impact over time, and (5) compensating for the impact as a last resort action. Further, the Service's mitigation policy establishes a concept of Resource Categories with designation criteria and mitigation goals for each category.

COE

The Clean Water Act gives the COE permitting authority under Section 404(a), 33 U.S.C.1344(a) (1988), with the obligation to consider the criteria promulgated by EPA pursuant to Section 404(b), 33 U.S.C.1344(b) (1988). To comply with the court ruling in *NRDC v. Callaway*, the COE expanded the jurisdictional reach of Section 404 from the traditional concept of navigable waters to one consistent with other CWA programs.

Department of Agriculture - Soil Conservation Service

The Soil Conservation Service is charged with delineating wetland under the swampbuster provision of the Farm Act. They employ the 1987 Wetlands Delineation Manual in this process. A Memorandum of Agreement, signed in January 1994 by the Departments of Agriculture, Interior, and Army and the Environmental Protection Agency, recognizes the USDA Soil Conservation Service as the lead federal agency for delineating wetlands on agricultural lands. Farmers can obtain a single wetland determination by the Soil Conservation Service for swampbuster and Section 404 purposes. The Section 404 program will continue to be administered by the Corps of Engineers.

Department of Transportation

The Federal Highway Administration funded the development of the Wetland Evaluation Technique (WET) in 1982-83. This technique has since been refined and re-issued by the COE (WET II). (See Appendix C.)

State Protection

State wetland regulations date from the Massachusetts legislation of 1963. Today, all coastal states have some form of regulation over alteration of marine wetlands, and 14 states have a freshwater wetland regulatory program. Currently, about 10 states use some form of classification system in their regulation of activities affecting wetlands.

Congressional response to the lack of success under CWA Section 208 resulted in the addition of Section 319, the Nonpoint Source Management Program, in 1987. Through EPA grants, Section 319 encourages states to opt into the federal program. The states may identify, inventory, and prioritize nonpoint source problems affecting their waters and develop strategies for addressing them, but no federal permit program is created under Section 319.

The certification requirement specified in CWA Section 401(a) is a powerful tool for state participation in CWA Section 404 federal permitting of dredge and fill activities in wetlands. The certification requirement is designed to ensure that projects requiring a federal permit comply with certain CWA requirements including state water quality standards.

Few states have promulgated water quality criteria for wetlands. The EPA has recommended that states develop water quality criteria for wetlands by using a two-phase approach. Phase I involves developing water quality standards for wetlands based upon existing information. The EPA expected the states to accomplish Phase I by the end of fiscal year 1993. Phase II involves further refinement of the water quality standards using new science and program developments.

Under Section 401 of the CWA, 33 U.S.C.1341 (1988), and Section 307(c)(3) of the Coastal Zone Management Act, 16 U.S.C. 1456(c)(3) (1988), Congress provided every state the authority to "veto," or to impose virtually any condition it wants, in every federal Section 404 permit and almost every federal permit under Section 10 of the Rivers and Harbors Act of 1899 (Chapter 425, 30 Stat. 1121).

Proposed Legislation

In October 1990, the Comprehensive Wetlands Conservation and Management Act of 1990 (H.R. 5968) was introduced. The bill, reintroduced as H.R. 1330 on March 7, 1991, would substantially modify the Section 404 wetland permit process by establishing a federal wetland classification program.

Other bills regarding wetland classification and/or protection have been introduced into the House to moderate or offset the thrust of H.R. 1330 and include: the Wetlands No Net Loss Act of 1991, H.R. 251, and the Wetlands Protection and Regulation Reform Act of 1991, H.R. 404.

Two bills have been introduced into the House in 1993, H.R. 350 and H.R. 1330; both contain amendments to Section 404 of the CWA.

APPENDIX B. NORTH DAKOTA'S NO NET LOSS OF WETLANDS LAW

North Dakota is located in the 300,000 sq. mi. area know as the Prairie Pothole Region, which produces one-half of the ducks in the contiguous United States in an average water year. Prairie wetlands exist in complexes of various types that are most easily defined by the degree of permanency of water. Of the estimated original 3 million acres of prairie wetland in the state, about 2 million acres remain.

In 1987, the North Dakota Legislature passed a law commonly referred to as No-Net-Loss of Wetlands (NNLW). The final bill was the result of intense negotiations and compromise between water development and wildlife interests in the State. Historically, wetland laws in North Dakota were permissive to the point of encouraging wetland drainage for agricultural purposes. Thus, the NNLW law was designed to restrict wetland drainage and to reduce the average annual loss of 20,000 acres. This law is the most significant piece of legislation affecting North Dakota's wetlands ever passed by the Legislature and includes a policy that states "that wetlands should be protected and preserved."

More recently, the law has been closely scrutinized and criticized by some conservation interests for being a "wetland mitigation bank" with serious flaws. On the other hand, attempts have been made to repeal the law by pro-drainage interests because the law is too restrictive. The original intent of the North Dakota law was to restrict and restrain wetland destruction. As is true with most compromises, the law has areas that can be improved.

To accomplish the goals set forth by NNLW, North Dakota law requires acre-for-acre replacement of all wetlands drained by state-authorized permits. A state permit is required for all wetlands with a drainage area of 80 acres or more (note, the size requirement refers to drainage area, not wetland acres). A statewide wetland banking system is used to track wetland losses and replacements within four biogeographical units (biotic areas) and individual counties. Only the acreage of restored and created wetland with "material wildlife values," as determined by the North Dakota Game and Fish Department, are credited to the bank as replacement wetland. This system is used to target replacements so that at least 50 percent of the lost acreage is replaced in the same biotic area. The law ensures that statewide wetland losses do not exceed replacements by more than 2,500 acres at any time, and the banking system is divided into temporary and permanent replacements. Only permanent replacements are allowed to be credited against drainage acres in the bank.

A party draining a wetland under a state drainage permit may replace an equal wetland acreage at their entire expense or by using replacement credits in the wetland bank with payment of 10 percent of the replacement cost. Replacement costs are calculated by adding the average land value in the biotic area and the estimated construction costs to replace that acreage. The wetland bank option cannot be used if replacements are not available. There is no direct requirement to replace wetlands that do not require a state drainage permit (less than 80 acre watershed), but those acres are registered as losses (debits) in the bank and reduce the available replacement acres (credits) in the area of drainage.

The concept embodied in NNLW, and the actual workings of the system, may do more to protect wetlands and guarantee a non-decreasing wetland base than any other regulatory approach could hope to achieve. In fact, the widely accepted Fish and Wildlife Service estimate of 20,000 acres of wetland lost per year has been eliminated, and the wetland bank currently shows a net increase of approximately 500 acres. Swampbuster is probably the main reason for halting wetland drainage, but over the long-term the no net loss program will maintain the existing wetland base.

Unlike other regulatory programs, North Dakota's no net loss incorporates flexibility, management, and balance. The key points of the program include:

1. Wetland Policy. This is essential because opinions and attitudes determine support and actions of landowners.
2. Drain Permit. Only those wetlands within a watershed area of 80 acres or more require a state permit.
3. Wetlands Bank. All drained wetlands, regardless of size, are counted as debits in the bank, and credits in the bank if restored or created (created wetland must have material wildlife values).
4. Replacement Requirements. All wetlands drained must be replaced with an equal acreage of replacement wetland. If a wetland has a watershed area of more than 80 acres, it must be replaced by the sponsor or landowner, using one of three options:
   a. Replacement on-farm

   b. Replacement off-farm arranged by the project sponsor
   c. Replacement off-farm through application to the wetland bank.
5. Replacement Costs. The project sponsor, whether individual landowners or others, is required to pay only 10% of the replacement costs if replacement is satisfied through wetland bank.
6. Debit Limits. The wetland bank cannot carry any more than 2,500 acres as debit.
7. Wetland Replacement Acquisition. This must come from willing sellers and cannot interfere with natural waterways or artificial channels.
8. Replacement Tax Payments. Land placed into federal ownership to meet replacement requirements must not diminish tax payments to local governments. Full replacement tax payments must be made.
9. Wetlands Bank. The wetland bank, for record purposes, is divided into four accounts:
   a. Government agency account
   b. Surface coal mining account
   c. Temporary account
   d. Permanent account - is for permanent credits and debits that comprise the true, usable bank balance.
10. Location of Replacement Wetlands. The replacement of wetland must come from the following areas:
   a. Same or surrounding counties - 50%
   b. Statewide - 50%
   c. If not available from same county or surrounding counties, replacement wetland can come from same biotic area.
11. Administration. Jointly administered by the State Engineer and the Game and Fish Director to guarantee an equal balance of management and decision-making. All permits must have joint approval.
12. Flexibility and Management. The no net loss program requires that the existing wetland base be maintained, but allows flexibility and management.

The North Dakota NNLW law is certainly subject to improvement and refinement, but results achieved to date are remarkable. The support and approval of the state (Governor and State agencies) and local governments cannot be under-estimated for those who are seriously interested in protecting wetlands.

When NNLW was developed, it was recognized that acre-for-acre replacement is a less than perfect method for conserving wetlands because it risks the loss of wetland values. An ecological equivalency method of replacement is obviously an ideal, although it may be impossible due to lack of knowledge in some areas of wetland functions. It also was recognized, however, that a value-based system such as in-kind replacement on a project-by-project basis would place unworkable demands on state agencies and individuals, and inherently lacks the flexibility to be acceptable and workable in North Dakota.

One potential problem with the NNLW law could be the under-reporting of drained wetlands in watersheds of less than 80 acres; draining is legal, but must be recorded as debits in the mitigation bank. Also, a recent review by the COE of the North Dakota wetland bank found that replacement credits weren't occurring in the desired biotic area of loss.

Another concern is that state and federal agency wetland restorations, as required by state law, are recorded as credits in the wetland bank. Some people conclude that these agencies are restoring wetland to facilitate drainage in other areas. A true mitigation bank would require full payment by those needing the mitigation credits.

In summary, the no-net-loss of wetlands law for North Dakota was heralded by many conservation interests as a landmark in state wetland protection. Proponents point out that the NNLW law needs refinement and improvement over time, but believe that this type of system can lead to balanced water management in the prairie states.

APPENDIX C. HABITAT EVALUATION TECHNIQUES

Several approaches to wetland evaluation for various community functions are in use, the COE's Wetland Evaluation Technique (WET II), the Habitat Evaluation Procedure (HEP) of the Fish & Wildlife Service, and a less widely known, community-oriented, Guild Matrix Analysis. The three differ markedly in approach and merits; each method includes habitat assessment, but in different levels and for different reasons. Accuracy of all evaluation systems is reduced by minimal databases, but goals may be more important than precision.

WET II is a system used to estimate wetland functions, using a rating of high, moderate, or low. The system includes functions such as hydrology, water purification, food production and export, fish and wildlife habitat, and values such as esthetic, historic, and passive recreation (Adamus et al. 1987). A major advantage of this system is the landscape approach that considers topography, wetland connectivity, and other geomorphic parameters. Although WET II uses waterfowl and wading birds as biological indicators, groups rather than species are assessed and habitat associations are not very specific. Moreover, rare species are immediate "red flags" that outweigh other considerations.

The Habitat Evaluation Procedure (HEP) is wildlife species-oriented (Flood et al. 1977), although sometimes, studies several species have been pooled to provide an assemblage or community-level treatment. The key feature is the Habitat Suitability Index (HSI; maximum value of 1.0) based on the best-available-data on habitat use by a particular species. This index is calculated for a specific area and is multiplied by acreage to produce Habitat Units. The logic of the calculation is that habitat lost or replaced should be estimated on the basis of quality rather than acreage. Thus, the technique can be applied to two areas for current comparison or to a before-and-after setting to measure loss (as in habitat damage) or improvement (as in restoration projects). HEP is limited because HSI models are not available for all species or areas, and models often are based on few variables and minimal data.

Partly as an outgrowth of attempting to broaden HEP to assemblages or communities rather than species, Short and Burnham (1982) devised a guild analysis using a resource matrix for bird species. As a community or habitat-oriented approach, Guild Matrix Analysis allows assessment at various scales and attempts to assess habitat resource availability in relation to behavioral characteristics of the guilds. The overall advantage is that it deals with large- and mid-scale issues using simple measures like presence and absence; general information can be used when detailed data are not available. Additionally, the scale can be modified to more detailed habitat units or to a specific species, but the focus remains on availability of habitat resources such as food, nest-sites, rest areas, etc. for a guild of species rather than on detailed knowledge of a single species or taxonomic group.

Any of these systems can be used to compare two or more wetlands, to compare a single wetland before and after impact or enhancement (as in mitigation banking), or to assess quality of a replacement wetland. Greater precision is required to measure enhancements than to measure restoration success (because restoration efforts tend to improve habitat less dramatically than those actions that start from near-zero). Measuring success of wetland restoration is more demanding than measuring the success of wetland creation. Hence, different goals demand different levels of precision.

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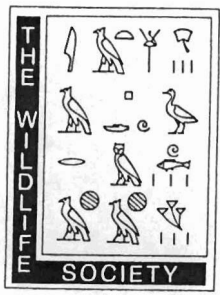

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