

AIR EMISSIONS BANKING AND TRADING: ANALYSIS AND IMPLICATIONS FOR WETLAND MITIGATION BANKING

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American Petroleum Institute
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MITIGATION BANKING**

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EXECUTIVE SUMMARY

Wetlands are highly complex and sensitive ecosystems providing a range of valuable services. Persistent concern over their rate of loss and degradation led the Bush and Clinton Administrations to declare a goal of "no overall net loss" for wetlands. Wetland mitigation banking is one of many policy tools that can help meet this goal. Wetland mitigation banking creates, restores, or enhances wetlands at one site to compensate for losses at other independent sites. While wetland mitigation banking currently is practiced on a limited scale in a number of states, banking is not presently a viable mitigation option in most cases. Legislation before Congress could vastly expand the scope of wetland mitigation banking.

In order to identify some of the issues that could affect the efficiency and effectiveness of a wetland mitigation banking system, this paper examines the history of air emissions banking and trading. While the particulars of the ERC market have changed over the years, one attribute remains constant: few transactions are taking place. During the beginning of the program, there were few transactions because of uncertain and cumbersome procedures and because locating a source willing to sell an ERC required expensive searches and/or govern-

ment assistance. Currently, transactions are infrequent because of low demand. Although several different factors contribute to the thin markets, most relate to the definition of the commodity and regulations that reduce the potential gains from trades.

Applying these lessons to wetland mitigation banking leads to the following recommendations: (1) the definition of wetland credits (acres, habitat units, or some other measure) needs a clear baseline, a close relationship to the goals of the wetland mitigation banking program, and guarantees against government confiscation; (2) the gains from trade need to be preserved by limiting trading restrictions, reducing transactions costs, and constructing clear and precise trading rules; and (3) financial assurances (performance bonds, escrow accounts, and sinking funds) need to be adopted because they provide an incentive for the credit producer to design, construct, and maintain a site properly and provide a source of funds for corrective actions if these things are not done. A wetland mitigation banking program that addresses these issues is more likely to achieve the goals of efficiently and effectively maintaining and improving the nation's wetland ecosystems.

INTRODUCTION

Wetlands, long considered undesirable wastelands, have entered into a new era as the public begins to regard them as valuable ecosystems worthy of protection. However, wetlands are often located in areas where people wish to reside, conduct business, build highways, recreate, or produce minerals.

To help resolve conflicts between wetland preservation and development in or near wetlands, the National Wetlands Policy Forum in 1988 issued a report which proposed the national goal of no-overall-net-loss of wetlands and specifically advocated the establishment of mitigation banks to help achieve this end. The Clinton Administration's wetland policy parallels this proposal as do several bills in Congress.

Wetland mitigation banking provides compensatory mitigation at one location for a number of independent development activities. A wetland mitigation bank could originate with restoration of a degraded wetland, enhancement of a functioning wetland, creation of a new wetland, or, in unique situations, preservation of an existing wetland. Wetland mitigation banking is performed at a location separate from where fill activity is to take place (offsite mitigation), and may involve resources that are physically and biologically different from those that were lost (out-of-kind mitigation). Banks can be constructed for the sole use of one party (self-financed); they can be constructed by a group who then will sell the wetland credits to the general public (market or fee based); or they can be in the form of a trust fund that developers pay into and which will be used to carry-out compensation activities at a later date.

Since 1980, approximately 45 wetland mitigation banks have been created by government agencies and private organizations, with many more in various stages of planning or development. An evaluation of these state and local banks is a logical step prior to a major federal initiative under the Clean Water Act. Indeed, there are a number of such studies in progress.¹ Beyond these reviews, there also may be important lessons for wetland mitigation banking in the historical record of other environmental trading programs.

Since the early 1970's, EPA and several states have introduced many environmental trading programs. Anderson et al. (1990) and Anderson (forthcoming) provide brief summaries of these programs. A careful analysis of the programs could yield information that would improve wetland mitigation banking policy. Accordingly, this paper takes a step in that direction by examining EPA's air emission trading program, the oldest and most extensive environmental trading program.

WETLANDS AND THE PETROLEUM INDUSTRY

Wetlands are very important to the petroleum industry: approximately one third of all domestic oil is produced in wetlands. Seventy-five percent of this is produced from Alaska's North Slope, which is technically a wetland. Most of the remaining twenty-five percent is produced in Louisiana's wetlands. Pipelines transport petroleum products across wetlands to and from marketing terminals and refineries that are sometimes also located in wetlands. This is particularly true in Louisiana and other states bordering the Gulf of Mexico where oil produced offshore is transported through

wetlands to onshore facilities by extensive pipeline systems.

To operate in wetlands, companies generally must obtain Section 404 dredge and fill permits from the Army Corps of Engineers. A survey of oil and gas producers (Guerrieri and Rusin, 1982) reported that of 794 wetland projects, 386 were to dredge canals or slips (for transporting drilling equipment), 182 were to prepare a drill site, 177 were to install gathering lines, and 109 were to install pipelines. The majority of the projects, 646, were in Louisiana, while 117 were distributed among the other states bordering the Gulf of Mexico. Twenty-eight were located in Alaska, and the remainder were scattered elsewhere across the country.

Increasingly, the Corps is demanding that compensatory mitigation be a part of any development activity in wetlands. No net loss policies would seem to leave no other choice. To assure no overall net loss of wetlands, the FWS stated [46 FR 7644, 1981] that compensatory mitigation activities (referred to as credits) are to be undertaken before development activities (referred to as debits) begin. Creating credits concurrently or after a development activity is considered inferior because there is a temporary loss of wetland services. However, concurrent or after-the-fact creation of credits offer a distinct advantage to advance provision of credits: they promote the creation of private, for-profit banks (Shabman et al., 1993). This would end the current system, which relies on developers performing their own mitigation work and which has a dismal record of success (King and Bohlen, 1994). Furthermore, the temporary loss of services can be compensated for by requiring developers to improve more wetlands than were

damaged. Lastly, to assure the availability of funds to perform the required mitigation, performance bonds and other financial assurances can be required of developers and/or bank managers. With this type of system concurrent or after-the-fact creation of credits is compatible with no overall net loss policies.

Data from Argonne (1993) provide an idea of the savings that are possible with banking. While conventional off-site mitigation costs exceeded \$20,000 per acre on average, only three of seventeen banks with documented costs exceeded this amount. Moreover, thirteen of the seventeen banks had an average per acre cost of less than \$10,000. Narrowing the comparison to projects involving wetland creation reveals that conventional mitigation costs about \$24,600 per acre while banked acres cost \$19,000. Much of the savings is due to economies of scale. King and Bohlen (1994) estimate that for each 10% increase in project size, costs per acre for non-agricultural projects decline by between 3.1% and 3.5%. Furthermore, Anderson and Rockel (1991) suggest that banking can reduce total permitting, with an attendant mitigation requirements, from years to months.

Given the amount of production, transportation, and refining of petroleum products that takes place on wetlands and the amount of money and time wetland mitigation banking can save, wetland mitigation banking could be of service to the petroleum industry. Recognizing this, Tenneco Oil Company in the early 1980's established one of the first wetland mitigation banks, covering approximately 7,000 acres in La Terre parish, Louisiana (Zagata).

WETLAND MITIGATION BANKING²

DESCRIPTION OF WETLAND MITIGATION BANKING

There are several advantages to a wetland mitigation banking program. Banking's primary advantage and impetus is its ability to facilitate compensation of small wetland losses in an environmentally superior fashion. Mitigation banking can effectively compensate projects deemed too small for onsite/inkind mitigation, providing a mechanism to avoid the small losses that constitute the bulk of current wetland loss. Furthermore, one large compensation site is more likely to benefit fish and wildlife, compared to many small sites, since 1) the likelihood of success is higher, 2) it can incorporate an entire ecosystem, and 3) greater regulatory oversight can be focused on it. Additionally, one large mitigation project is less expensive than many small ones due to economies of scale.

Other advantages arise because banks can be established in advance of the impact. This eliminates the lag time between loss and replacement and can actually result in a temporary increase in wetlands if a bank is not debited immediately after the credits are created. From the perspective of the developer, the advance availability of credits provides permit applicants with an estimate of how much their required mitigation will cost based on the market price for mitigation credits (Riddle).

Lastly, banking can reduce the time needed to acquire the federal permits required to conduct a fill project. Currently, permitting for a significant project, with the associated mitigation requirements, may take from three to five years; mitigation banks might reduce the permitting time frame to months (Anderson and Rockel). Some see

this as mitigation banking's greatest service to industry.

A bank begins when several parties form an advisory group to design the bank. These parties generally include representatives of state and federal commenting agencies; local, state, and federal permitting agencies; permit applicants; environmental interest groups; as well as the bank sponsor. Past sponsors have included industrial firms, individual entrepreneurs, public agencies such as state highway departments, quasi-public entities such as port authorities, and federal agencies (Reppert).

The bank is formally established through a banking agreement, usually a Memorandum of Agreement (MOA) or Understanding (MOU). A MOA is a contract signed by all participating parties. It lists the responsibilities of all signatory parties concerning management objectives, management techniques, crediting and debiting procedures, long-term operation, and provisions for corrective actions in the event of failure.

A) LEGAL BACKGROUND

The legal basis for pursuing mitigation rests on several pieces of legislation involving the Army Corps of Engineers (the Corps), the Environmental Protection Agency (EPA), and the Fish and Wildlife Service (FWS). The Corps' involvement in wetlands can be traced to Sections 9 and 10 of the 1899 Rivers and Harbors Act, which prohibits dredging, filling, or other activity that would impact the navigable capacity of any water without a permit from the Corps.

Section 404 of the Clean Water Act, which is the principal federal mechanism for

protecting wetlands, gave the Corps much broader permit authority over dredge and fill activities. (Dredge and fill permits granted under the Clean Water Act are often referred to as "Section 404 permits".) Section 404 of the Clean Water Act, as implemented by the Corps (33 CFR 320.4(r)), requires that mitigation be considered throughout the permit application review process.

Section 404 also expanded EPA's authority over wetland use. The EPA Section 404(b)(1) Guidelines establish specific environmental criteria which must be met for activities to be permitted under Section 404. These guidelines (40 CFR 230.10(d) in particular) require EPA officials to take all appropriate and practicable steps to minimize the potential adverse impacts on wetlands. The Clean Water Act also gives EPA the authority to overrule or veto a Section 404 permit granted by the Corps if it finds that discharges or other effects pursuant to that permit will damage municipal water supplies, shellfish beds and fishery areas, wildlife refuges or recreational areas. As of August 1990, EPA had exercised its veto power over the Corps ten times since adoption of the Clean Water Act (CWA) in 1972 (Butler and Binion).

The Fish and Wildlife Coordination Act of 1958 involved the Fish and Wildlife Service (FWS) in wetland use. It requires FWS to seek mitigation for losses of fish and wildlife habitat resulting from land and water development. Therefore, even though FWS is not a regulatory agency in the Section 10 or Section 404 permit process, FWS participates in the process by evaluating potential project impacts on fish and wildlife and by recommending appropriate mitigation to the regulatory agency. The Corps, nevertheless, has ultimate authority to condition

Section 10 and Section 404 permits with mitigation requirements (Short).

After Congress passed the CWA, the Corps adopted the principle that if the applicant for a Section 404 permit agreed to reduce the impact caused by the proposed operation by altering the project plans, the permit would be granted. EPA, though, felt minimization of impacts should be considered acceptable only in situations where avoidance of filling the wetlands is impossible. The result of this conflict was the 1990 Memorandum of Agreement (MOA) signed by EPA and the Corps. The Corps agreed that its review and decisions on all Section 404 permit applications will be based on factors considered in the following order of priority:

- 1) Avoidance: The Corps presumes that alternative sites exist;
- 2) Minimization: If no alternative site is available, the Corps considers methods by which the proposed project can be modified to minimize unavoidable wetlands impact; and
- 3) Compensatory Mitigation: The applicant for the Section 404 permit may be required to acquire or set aside additional land for the purpose of restoring or creating new wetlands. (Butler and Binion)

This review process is often called "sequencing". The MOA recognizes that mitigation banking may be an acceptable form of compensatory mitigation (Reppert), although the MOA emphasizes onsite and inkind mitigation (Shabman et al.).

B) FINANCING

Banks can be structured several different ways. Self-financed banks involve

a sponsor using his own funds to undertake a mitigating action to offset debits he plans on incurring. ELI (p. 41) notes that 42 of the 46 existing banks are dedicated exclusively to the use of the credit producer.

Another form of banking is the in-lieu fee system (also called mitigation trusts) where permit applicants are allowed to contribute to a state-managed fund at a level based on their project's impact. When the fund reaches a predetermined amount, the agent (usually a state resource agency) then creates or restores a wetland. In-lieu fee arrangements often are not considered in the same class as banks per se since they do not create a store of credits before an impact. There is also a risk that the funds collected will not be used for wetlands compensation but will be used by the state for other purposes. Shabman et al. note that this has occurred in many states with trust funds earmarked for other purposes. Six wetland mitigation trusts are known to exist at present, in Maryland, Louisiana, California, Oregon, New Jersey, and Hawaii (Reppert).

The last form of banking is market based mitigation. This type of banking involves an entrepreneur investing in the creation or restoration of a wetland in order to sell the resulting credits to developers for a profit. The environment benefits from a market in wetland credits because small fill projects, where it would not be feasible to mitigate onsite/in-kind or to establish a self-financed bank, can be successfully compensated. By allowing permit holders to satisfy their mitigation requirements by purchasing credits from a large, well-located mitigation bank, the total quantity and quality of wetland functions in the watershed can be increased. This is particularly true if resource agencies incorporate mitigation bank-

ing into overall watershed management.

A market in wetland credits also can reduce a resource agency's exposure to claims of "compensable takings". *Lucas v. South Carolina Coastal Council* (112 S. Ct. 2886, 22 ELR 21104, 1992) established that if a governmental regulatory action destroys "all economically beneficial or productive use" of privately owned property, the action can represent a compensable taking (or taking for short). This means that the government must compensate the property owner for the losses incurred as a result of the regulatory action. In wetlands regulation, this means that if an owner of a wetland is denied a permit to develop his wetland, and the land has no other economically beneficial or productive use, he can bring action against the regulatory agency for compensation. Since the *Lucas* case the number of taking cases submitted has increased (Haynes II and Gardner).

A market in credits can reduce the risk of taking in two ways. First, easily accessible compensatory mitigation might make the Corps less likely to deny a permit and, more importantly, denial of a permit would not destroy a wetland's entire value. An active market for wetland credits requires wetlands which can be purchased for restoration or enhancement. Denial of a development permit means that the wetland still has value as an enhancable or restorable wetland. However, in two recent cases (*Loveladies Harbor, Inc. v. United States* and *Formanek v. United States*), the lack of a "competitive market" for mitigation sites forced the court to conclude that a taking had occurred (Haynes II and Gardner). To address this concern, wetland mitigation banking regulations must be drafted to encourage entrepreneurial (market based) banks and not just the

self-financed banks that dominate the current system.

Developers benefit from a market system too. One of these is reduced cost of mitigation. Owing to economies of scale and specialization, purchasing credits from a very large supplier should be less expensive than performing small onsite projects. Also, trading rules may encourage more restoration firms to enter the market, leading to a more competitive market and a price that is closer to costs. Restoration firms benefit since trading rules will increase the demand for their services.

C) INKIND/ONSITE MITIGATION

Currently, the emphasis during permit review is on inkind/onsite mitigation. The advantage of inkind mitigation (providing substitute resources which are physically and biologically the same as or similar to those lost) is that it requires less understanding of trade-offs because it is based on the assumption that certain wetland functions (both those understood and less well understood) will follow the wetland form (ELI).

However, out-of-kind mitigation may restore a locally rarer wetland or provide a needed function like flood control. Trade-offs between habitat types have been negotiated on a case-by-case basis in several existing wetland mitigation banks (Reppert).

Onsite mitigation is theoretically desirable since it might maintain the physical continuity, ecological integrity, and use patterns of the original habitat (Reppert). Furthermore, many benefits of wetlands are site-specific. "The issue is not just the quantity of water quality protection, flood

storage, flood conveyance, etc. provided by a wetland but what people and resources are benefiting from these functions" (Kusler).

In practice however, Shabman et al. contend that the emphasis on onsite mitigation has led to fragmented and isolated wetlands running between concrete parking lots, commercial facilities, and residential developments. Furthermore, run-off and other impacts from adjacent development may degrade wetlands mitigated onsite, as well as the remaining natural wetlands. Not surprisingly, onsite mitigation has a dismal record of success (ELI).

Even when onsite mitigation can be conducted successfully, many of the wetlands remaining today are residuals from the development process and therefore may not be the mix of wetland types and locations that best serves the watershed or watershed restoration goals. Off-site mitigation offers the ability to situate a bank within a broader area allowing the bank to meet a larger number of ecological goals. It also allows for producing and managing a larger mitigation site than is usually possible with onsite mitigation.

One means of facilitating off-site and out-of-kind mitigation is trading ratios. Trading ratios can require replacement of more than one yards of riparian wetlands for every yard lost. Likewise, it can require several acres of bogs be restored for every acre of prairie pothole wetlands lost. Trades such as these are useful in situations where quantity increases can compensate for quality lost. However, for sensitive situations, such as filling bogs, which take centuries to mature and are increasingly rare (ELI), inkind/onsite may be the only alternative. Conversely, trading ratios of less than unity

could be used to promote restoration of a bog in exchange for permitting development activity on a degraded coastal wetland.

D) CURRENCY

The method of quantifying debits and credits is one of the most important elements in a MOA. Hundreds of evaluation methods have been developed to allow comparisons between one wetland and another (ELI p. 77). These methods attempt to measure or describe the nature and services provided by wetlands and fall into one of three categories: those that provide a surrogate indicator of the ecological functions of wetlands; those that measure a limited range of wetlands functions; and those that examine a broad range of wetland functions. There is a trade-off, though. The more complex a measure, the more resources that must be expended to evaluate any trade.

Acreage-based methods fall into the first category. Acreage is simple and inexpensive to quantify; however, it has very little connection with the ecology of the wetland. Many state DOT banks use inkind acreage as the credit definition. Another measure is diversity. Diversity indices usually take into account both the number of different species and the relative proportions of those different species in a given area. While some banks use diversity as a supplement to acreage trades, none use it solely.

Narrow measures of wetland services are able to estimate more accurately a wetland's ability to provide a particular function. Most mitigation banks using a narrow measure have used the Habitat Evaluation Procedure (HEP), (in its present form or a slight variation of it). HEP involves estimating the quantity of various wetland

attributes that are important to one or more selected fish or wildlife species. (The species chosen can be based on their economic value.) These quantities are compared with the "optimal habitat" (i.e. the habitat which could support the largest possible carrying capacity) to produce a Habitat Suitability Index (HSI), which ranges from 0 to 1 for each species. This index is multiplied by the number of acres that share those characteristics to produce a value called Habitat Units (HU), which can be used to evaluate trades. HEP, though, does not evaluate a wetland's ability to perform non-habitat functions such as flood control or storm buffering. Some measures have been created to estimate non-habitat functions, but they have not been used by any bank (ELI, p. 84).

A measure that incorporates a broad range of functions in recognition of the complex nature of wetlands is the Wetland Evaluation Technique (WET). WET accounts for habitat and non-habitat functions. In particular, WET considers groundwater recharge and discharge, flood-flow storage and desynchronization, shoreline anchoring and dissipation of erosive forces, sediment trapping, nutrient retention and removal, food change support, fisheries and wildlife habitat, active and passive recreation, and heritage value. It accomplishes this by gathering information on approximately 80 wetland attributes. The method combines the attributes to provide ratings (low, moderate, or high) for three criteria for each of the listed functions. The criteria are "effectiveness" (can the wetland perform the function?), "opportunity" (does the wetland have the opportunity to be effective?), and "social significance" (how important is the function to society?). Such a complex evaluation system also carries a high cost to perform and can fail to differentiate between different

types of wetlands and wetlands in different regions.

E) CREDITING

Under FWS policy, mitigation banks are credited only for wetlands created, enhanced or restored expressly for mitigation purposes. Therefore, fish and wildlife benefits generated incidental to normal land management practices are not considered either as mitigation or as bank credits (Soileau). *Preservation* is generally excluded as a mitigation technique except when the habitat value of the area is in imminent and unavoidable danger of being lost or degraded unless appropriate action is taken. An example is Fina LaTerre Mitigation Bank in Louisiana.

The uncertainty surrounding wetland mitigation techniques is a concern of many resource managers (Reppert). Wetland *creation* is regarded in scientific circles as being a somewhat experimental technique. Artificial wetlands under close scientific scrutiny have failed to yield the equivalent attributes of the natural wetlands that they were intended to replace (Reppert). This may change as the wetlands mature but the time needed and the probability of eventual success is uncertain at best.

Wetland *restoration and enhancement* are more reliable techniques. The National Research Council's report on restoration of aquatic ecosystems identifies five wetland systems as ideal candidates for restoration efforts. They include coastal and estuarine, riparian, depressional or isolated, agricultural, and freshwater wetlands. Coastal and estuarine wetlands are of particular interest since they are relatively rare and provide economic benefits as nurseries for commer-

cial and sport fish, shellfish, and as stormwave buffers. Moreover, because they do not require heavy grading equipment or restoration of hydrology, they are generally less expensive to restore. Wetlands that have been converted to agricultural uses can be restored by breaking drainage tiles and filling ditches (ELI).

F) DEBITING

The Corps' permit review process allows debiting at a wetland mitigation bank only after the Corps has determined that 1) wetland losses cannot be avoided, 2) efforts to minimize wetland losses through modification of construction plans and designs have been undertaken and 3) mitigating losses onsite is not feasible. This is consistent with the Corps' sequencing provisions; however, there is concern that sequencing will be neglected and that bank credits will be used before all means of avoiding or minimizing impacts have been exhausted (Soileau et al.).

Accounts can be debited prior to, concurrent with, or after the account is credited. However the Fish and Wildlife Service's definition of mitigation banking [46 FR 7644, 1981] specifically refers to credits being available for *future* development actions in order to assure there is no loss of services. Even concurrent debiting entails a temporary loss of services due to the time it takes a new or enhanced wetland to become fully functional. However, this can be compensated for by requiring developers to improve more than the amount of wetlands damaged to offset the temporary loss of services.

G) PROPERTY RIGHTS

Ownership of the mitigated site is established by title possession. Existing wetland mitigation banks have been located on privately owned lands, lands leased or acquired in fee by bank sponsors, or on publicly owned lands under agreement between bank sponsors and the public land managing agency (Reppert). Highway departments, the primary sponsors of wetland mitigation banks, transfer the title to bank lands to a state resource agency for perpetual management (Reppert). Although title transfer is desirable, easement or deed restrictions have been used to ensure that the habitat values remain throughout the life of the bank (Short).

H) MITIGATION FAILURE

One of the primary concerns in wetland mitigation banking is mitigation failure. Shabman et al. and the National Research Council conclude that many cases of mitigation failure are caused by the failure of the bank manager to satisfy his end of the agreement rather than failure with the science. The breakdown can occur at many stages. ELI (p. 109) cite a study that estimates that 90% of the **onsite** wetlands mitigation projects in Southern California were never completed as required. They also cite a study that states that many mitigation ef-

forts in Florida were never even started. Other studies also show substantial noncompliance. Shabman et al. suggest that where developers are forced to mitigate, the job will often be of low quality since firms will try to cut costs and resource agencies' funds are too limited to ensure a quality job is done. If and when the mitigation fails, there may be no responsible party liable for rectifying that failure. ELI (p. 104) states that most non-DOT banks are silent as to liability. In the end, even if the project is completed successfully, there is often no assurance that the site will be maintained as a wetland into the future. ELI (p. 115) notes that mitigation banks have been targeted frequently as the least expensive and most direct route for additional highways.

To begin coping with mitigation failure, definitions of success and failure in mitigation and procedures for when a failure occurs need to be established. Creation of standards for marketable credits is very important to achieving ecologically-satisfactory results. As stated in the ELI report, "The demand for credits is wholly derived from the demand for development permits, not from an intrinsic demand for quality mitigation wetlands. There is, therefore, no competition among mitigation credits on the basis of quality. Government establishment of credit standards is critical."