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Mitigation under Section 404 of the Clean Water Act: where it comes from, what it means

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Abstract The requirement to mitigate impacts to wetlands and streams is a frequently misunderstood policy with a long and complicated history. We narrate the history of mitigation since the inception of the Clean Water Act Section 404 permit program in 1972, through struggles between the US Environmental Protection Agency and the US Army Corps of Engineers, through the emerging importance of wetland conservation on the American political landscape, and through the rise of market-based approaches to environmental policy. Mitigation, as it is understood today, was not initially foreseen as a component of the Section 404 permitting program, but was adapted from 1978 regulations issued by the Council on Environmental Quality as a way of replacing the functions of filled wetlands where permit denials were unlikely. EPA and the Corps agreed in 1990 to define mitigation as the three steps of avoidance, minimization, and

compensation, principles which must be applied to permit decisions in the form of the environmental criteria in EPA's 404(b)(1) Guidelines. Through the 1980s and 1990s, the compensation component of mitigation has become nearly the sole focus of mitigation policy development, and has been the subject of numerous guidance documents and memoranda since 1990. Avoidance and minimization have received far less policy attention, and this lack of policy development may represent a missed opportunity to implement effective wetland conservation.

Keywords Wetland mitigation · Compensation · Wetland policy · Clean Water Act · Wetland banking · 404 Permit program

Introduction

There are few words in the lexicon of wetlands regulation in the United States more freighted with baggage than the term “mitigation,” and fewer still are so commonly misused and misunderstood. Before embarking on the complex history of mitigation in the Clean Water Act Section 404 regulatory program, perhaps it is best to begin from a simple point of reference for the term. The word mitigation is derived from the Latin verb *mitigare*, which, significantly, can mean both “to make less severe,” or “to appease, assuage or pacify.” Accordingly, in the context of the

Palmer Hough: The views expressed in this article are the author's own and do not necessarily reflect the views or the policies of the Environmental Protection Agency.

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Section 404 program, mitigation entails actions taken to make permitted impacts to the aquatic ecosystem less severe. Observers of the history of mitigation, however, can be forgiven for concluding that mitigation also entails the appeasement or pacification of many divergent interests.

Section 404 of the 1972 Federal Water Pollution Control Act establishes a permit program to regulate the discharge of dredged or fill material into “waters of the United States,” including wetlands. Congress divided responsibilities for Section 404 between the US Army Corps of Engineers (the Corps) and the US Environmental Protection Agency (EPA). The Corps was tasked with the day-to-day administration of the permit program, issuing permits for regulated activities in the nation’s waters. EPA develops the environmental criteria used by the Corps to make its permit decisions and shares enforcement authority with the Corps for Section 404. In this partnership, EPA and the Corps develop national Section 404 mitigation requirements and policy in close collaboration; however, forging a common vision and interpretation has not been easy. The following history of wetlands mitigation under Section 404 is largely the story of these two federal partners attempting to bring together their divergent missions and divergent constituencies to serve the common need to protect the nation’s wetlands. It is our contention that, at a time when compensatory wetland mitigation practices have recently been revisited in a major federal rulemaking (Corps and EPA 2008), mitigation policy and practice will benefit from a focused understanding of the history of the three forms of mitigation: avoidance, minimization, and compensation. We discuss mitigation in a modified chronological way, working from the origins in the 1970s towards the present, but stopping along the way to highlight key elements such as the nature of the three forms of mitigation and the persistent importance of issues such as wetland categorization and wetland banking.

The early years of wetland mitigation

In retrospect, it has been only 15 years since the concept of wetland mitigation was first proposed as a permit stipulation. The initial concept (acquisition and preservation of

undeveloped wetlands in exchange for permits to develop other wetlands) evolved significantly before it was codified as a written document. In that relatively brief time period, we have generally succeeded in establishing the legitimacy of the concept.

LaRoe (1986, p. 9)

The legislative driver behind the need to mitigate wetland impacts came in the 1972 amendments to the Federal Water Pollution Control Act (FWPCA), which was renamed the Clean Water Act in its 1977 amendments. The FWPCA was originally passed in 1948 primarily as a bill to fund the construction of municipal water treatment works and encourage other voluntary measures to promote hygiene. The 1972 amendments, however, transformed the Act from a funding vehicle to a regulatory mechanism. The most significant transformation for our purposes was the establishment of a permit program in Section 404 that regulates the discharge of dredged or fill material into waters of the United States. The reason often cited for the division of Section 404 duties between EPA and the Corps was the Army’s extensive expertise in running a water resource permitting program under the Rivers and Harbors Act of 1899 (although RHA permits had only considered environmental criteria since 1968). It is also likely, however, that the Army did not wish another agency to have power over the permitting of their own Civil Works projects (such as new dams, harbor improvements, etc.), and decided that if there were to be a more extensive aquatic resources permitting program, it would be better administered by the Corps than by another agency (Blumm and Zahela 1989, p. 704).

The Corps had been administering the RHA Section 10 program for decades, and it included a review that allowed the Corps to reject permit applications for work in navigable waters that were shown to be against the public interest. However, this review did not explicitly or regularly include environmental criteria until 1967, when the US Fish and Wildlife Service (FWS) began to insist that the terms of the 1939 Fish and Wildlife Coordination Act required the Corps to consider damage to habitat as part of the public interest review. An agreement between the two agencies was signed (Corps and FWS 1967), and revised Corps permit regulations

were issued in 1968 (Corps 1968). Thus by 1972 there was already a large environmental permit program in place applying environmental criteria to the regulation of navigable waters, and critics at the time were concerned that the CWA would simply create a duplicate program. For the most part, the CWA Section 404 permit program has been integrated with the RHA Section 10 permit program, but in certain situations their distinction becomes crucial. For example, states can assume control over the Section 404 program in certain waters, but not over the Section 10 program.

Given the consuming nature of fundamental questions concerning the extent of CWA jurisdiction (cf. Wood 2004), the development of mitigation requirements was not immediately a central issue after the passage of the 1972 CWA. Furthermore, mitigation may not have initially been seen as a priority if it was assumed that permits for work which truly damaged wetlands would either be denied by the Corps or “vetoed” by EPA under its Section 404(c) powers. While this position seems unlikely today, mitigation for permitted impacts was not specifically mentioned when EPA developed the environmental criteria for the issuance of Corps 404 permits in 1975 (EPA 1975). However, the considerable changes made to the permit program in the 1977 amendments to the Clean Water Act made the question of mitigation unavoidable. Congress’ affirmation of the use of General Permits by the Corps (see below) was an acknowledgement that Congress intended the 404 program to allow large numbers of permitted impacts which damaged wetlands. Making the permitting process manageable for Corps staff and less time-consuming for some applicants begged the question of how so many permits could be issued while still achieving the statutory goals of the CWA: assuring the biological, chemical and physical integrity of the nation’s waters. As questions of jurisdiction and workload began to recede, attention turned to the process of mitigating the effects of massive numbers of permitted impacts.

The first Corps Section 404 permit regulations, in 1973, provided for unspecified mitigation measures to be required for activities that impacted fish and wildlife habitat: “The applicant will be urged to modify his proposal to eliminate or mitigate any damage to such resources, and in appropriate cases the permit may be conditioned to accomplish this purpose” (p. 12220). However, wetlands per se were addressed in a different

paragraph, where no similar provision was made. Kruczynski (1990) notes that some mitigation was performed in association with permits in the 1970s, but was not sanguine about it. “[A]s early as 1975 agencies would compromise their positions on a permit application as long as there was, at least on paper, no net loss of wetlands. Federal agencies recommended compensatory replacement mitigation, in part, due to EPA’s hesitancy to use its Section 404(c) authority [to veto the issuance of Corps permits]” (p. 551). Thus, the practice of mitigation grew as a consequence of the agencies’ minimal use of their CWA authorities: Corps’ unwillingness to deny permits that entailed significant environmental damage, and EPA’s unwillingness to veto such permits. Without the use of 404(c) permit “vetos,” there was simply no mechanism to enforce the inclusion of mitigation conditions in a permit because EPA’s 1975 environmental criteria for the issuance of permits were understood to be advisory only, and did not mention mitigation mechanisms in any event (Liebesman 1984).

At this time, and in fact throughout much of the 1980s, it was FWS and (in coastal areas) the National Marine Fisheries Service (NMFS) that were more empowered to request that mitigation measures be attached to permits. This was an exercise of their Fish and Wildlife Coordination Act and Endangered Species Act authorities, and it was used extensively (LaRoe 1986). A NMFS survey in 1981 showed that NMFS commented on 22% of the 404 permit applications that it reviewed, and that its mitigation recommendations were incorporated 98% of the time (Hall 1988). Often these mitigation measures took the form now termed “compensation,” using the new technology of marsh creation which had developed from the successes of the Corps’ Dredged Material Research Program (Webb et al. 1986): “Initially developed as a technique to stabilize and improve the appearance of dredge spoil materials, marsh construction is currently advocated not only to minimize environmental damages due to development, but to offset losses of natural wetlands” (Race and Christie 1982, p. 317). However, Kruczynski notes that the early successes of these projects in tidal areas were used to justify the use of site replacement in wetland ecosystems not as easily restored (such as bogs, fens, and bottomland hardwood swamps), and with a less well-documented history of technical experimentation (Kruczynski 1990, p. 552).

General permits

The 1977 Amendments formalized the Corps' authority to issue the General permits it had already been issuing as a way of managing an overwhelming permit workload. A permit taxonomy has since developed describing four types of permit in two categories: Individual permits are either Standard permits or Letters of Permission, while General permits are either Nationwide permits or Regional permits. General permits were designed to be issued on a state, regional, or national basis covering entire categories of activities that are determined to be similar in nature and will cause only minimal environmental harm when evaluated either individually or cumulatively. The General permit process lacks the more rigorous environmental review conducted for Individual permits, allowing certain minor impacts to proceed with little or no delay, provided that the conditions for the use of the General permit are met. For example, minor road construction and maintenance activities and utility line backfill are activities that can be considered for a General permit. Some of the efficiency of General permits arises from the fact that compliance with Section 404 mitigation requirements is assessed only once, when the General permit is issued, rather than each of the many times it is used. Difficult questions about how much avoidance, minimization, and compensation are required for such impacts are therefore ideally addressed in advance, although the Corps is free to add case-by-base mitigation conditions at its discretion, or using information generated through the pre-construction notification process (Corps 2007).

The number of Individual permit applications has declined significantly in recent years (from 17,864 in 1988 to 11,180 in 2005), while the number of General permit applications has expanded dramatically (from 39,583 to 78,336).¹ In 2006, of the approximately 96,500 permit applications evaluated by the Corps, 88% were General permits.² Analysis of permit actions in recent years found that in a typical year, over half of the impacts permitted by the Corps are authorized through General permits (Corps 2006).

¹ Personal communication between David Olson and Palmer Hough, 9-27-06.

² Personal communication between Russell Kaiser and Palmer Hough 4-19-07.

There has been a trend towards applying NHPs to ever-smaller impacts. This is significant for mitigation because there has also been a trend towards increasing compensatory mitigation requirements for many General permits, a practice initiated in the Corps 1991 NHP permit regulations (Corps 1991). In 2007, General Condition 20 (previously 19) was revised to explicitly expand potential compensatory mitigation requirements for certain impacts less than 1/10th of an acre (Corps 2007).

Birth of the mitigation sequence

“The mitigation sequence” consists of the procedural steps in which decisions about the level of impact and of appropriate mitigation are made. It has now passed into regulatory vernacular and its origins are not generally appreciated. Daily practice and federal guidance tells us that mitigation consists of impact avoidance, impact minimization, and impact compensation, to be achieved in that order. Terms like “mitigation” and “minimization,” and the concept of an alternatives analysis that prioritizes avoidance, had appeared in policy debates at the state and federal level throughout the 1970s (LaRoe 1986). However, they were not all brought together in a structured way until the Council on Environmental Quality clarified National Environmental Policy Act (NEPA) regulations in 1978. Section 1508.20 of these regulations defines “Mitigation”:

Mitigation includes: (a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources or environments.

Soon afterwards, EPA issued a revision of the 1975 environmental criteria, which had not mentioned mitigation. The new regulations, known as the Section 404(b)(1) Guidelines, were issued in final form on December 24, 1980 (EPA 1980). Despite the

sobriquet “Guidelines,” they are regulation rather than “guidance.” Though not explicitly tied to the 1978 CEQ NEPA mitigation regulations, the preamble to the proposed Guidelines (44 FR 54223) affirms their mandatory nature by pointing to two existing statutes: the CWA’s statutory requirement that the 404 permit program be “based on criteria comparable to” the Section 403 ocean discharge criteria, and NEPA’s concept of an alternatives analysis. The relationship between the 1978 CEQ NEPA Mitigation rule and the 1980 EPA Guidelines was made explicit in 1990 (Corps and EPA 1990).

The Guidelines construct a series of prohibitions and rebuttable presumptions that, taken together, mandates a *sequence* of events that must be followed when issuing and conditioning a permit: an “alternatives test” designed to identify the least environmentally damaging practicable alternative (LEDPA) must come *before* efforts which address unavoidable impacts. This mitigation sequence is contained in four main requirements:

1. Section 230.10(a) prohibits a discharge if there is a less environmentally damaging practicable alternative to the proposed project. These alternatives are presumed to exist for activities which do not need to be sited near water to fulfill their “basic project purpose.”
2. Section 230.10(b) prohibits discharges that will result in a violation of the water quality standards or toxic effluent standards, jeopardize a threatened or endangered species, or violate requirements imposed to protect a marine sanctuary.
3. Section 230.10(c) prohibits discharges that will cause or contribute to significant degradation of the waters of the United States. Significant degradation may include individual or cumulative impacts to human health and welfare; fish and wildlife; ecosystem diversity, productivity and stability; and recreational, aesthetic or economic values.
4. Section 230.10(d) prohibits discharges unless all appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

To achieve mitigation through avoidance, permittees must understand available alternatives to the proposed action, and so Section 230.10(a)(3) establishes two rebuttable presumptions for non-water dependent activities (homes, shopping malls,

highways, etc.) that are proposed in aquatic sites. First, it is presumed that alternatives that do not impact aquatic resources are available and feasible. Second, it is presumed that such alternatives are environmentally preferable. Both presumptions may be rebutted by the applicant.

The practical meaning of the Guidelines is best expressed in the 1990 Memorandum of Agreement (MOA) between EPA and the Corps (Corps and EPA 1990) (see below). In that MOA, it was clarified that three sequential steps of mitigation are ways of achieving the requirements laid out in the four paragraphs of the Guidelines’ Section 230.10. *Avoidance*—making the impact as small as possible—can be achieved by applying the rebuttable presumptions and the identification of the LEDPA in Section 230.10(a), by adhering to the environmental standards identified in Section 230.10(b) and by designing a project to prevent significant degradation as described in Section 230.10(c). *Minimization*—making an unavoidable impact as innocuous as possible—may be achieved by applying measures described in Sections 230.10(d) and 230.75, such as utilizing alternative project designs and construction methods, to attain compliance with Section 230.10(a)–(c). Finally, *compensation* can be achieved by applying ecological restoration measures identified in Section 230.75(d) (in Subpart H of the Guidelines) to mitigate certain kinds of remaining impacts addressed in Sections 230.10(b) and (c).

The concept of mitigation as distinct and sequential steps is found only in a somewhat convoluted form in the actual Guidelines, and thus most are more familiar with the interpretation offered in the 1990 MOA. It is not clear when the notion of three distinct steps first arose, distinct from the five-part definition articulated by CEQ in 1978. As early 1982, Race and Christie stated:

Many commentators tend to apply the term mitigation to three categories that can be described as 1) planning to prevent damage to the environment, 2) design and execution of projects to minimize adverse impacts, and 3) restoration or compensation for unavoidable damage to the environment. New definitions are continually generated and manipulated to suit the purposes of a given author, developer, or regulator. However, all of the definitions expand upon the traditional definition of

mitigation, which focuses on post facto actions taken to restore or compensate for the unavoidable impacts of an activity on wetlands. The evolution of the definition is understandable; it is disagreeable to many people to assume damage without some attempt at protection first. (1982, p. 318)³

Although their application has evolved over the past three decades, the 404(b)(1) Guidelines remain different from nearly all other descendants of NEPA: given regulatory force by their CWA setting, they moved beyond simple procedural prescriptions and affirmatively required certain outcomes: “The guidelines were more than an exercise in education; they were an exercise in reaching a substantive result, and alternatives were the lever” (Houck 1989, p. 805).

Another sequential approach to the steps of mitigation was contained the 1981 FWS mitigation policy (FWS 1981). This FWS policy is also the source of the “on-site” and “in-kind” preferences for compensation requirements and is an early expression of a “categorization” system applied to environmental impact permitting (see below). The FWS policy, used in formulating mitigation recommendations for Corps permit applications, stated that “These means and measures are presented in the general order and priority in which they should be recommended by Service personnel...” (FWS 1981, p. 7660), and retained the five CEQ mitigation categories of Avoidance, Minimization, Rectification, Reduction and Compensation. However, the application of these categories as a sequence was couched within four categories of impact. Resource Category 1 is afforded the highest level of protection and only insignificant impacts should be permitted. The mitigation sequence only applies to Resource Categories 2 through 4, while the requirement that any compensation be of the same habitat type (the “in-kind” preference) is progressively loosened from Resource Categories 2 to 4.

Throughout the 1980s, the FWS had a more sophisticated approach to mitigation than either the EPA or the Corps (LaRoe 1986). While EPA and the Corps battled over jurisdictional extent of the permit

program, FWS was developing mitigation banking guidance (FWS 1983) and wrestling with compensation site performance standards and credit determination (using assessment methods such as the Habitat Evaluation Protocol). What FWS lacked was a mechanism to force the Corps to use FWS mitigation recommendations (Brown 1989). For many years, for example, some Corps districts considered off-site mitigation to be impracticable by definition, and so the Corps often refused to require any FWS compensation recommendations where on-site compensation was not possible (Soileau 1984, p. 2). This left the FWS strongly-motivated to develop a practicable and efficient off-site compensation method, which led directly to the birth of wetland banking at the Lafayette Field Office in 1981, and to the FWS 1983 banking guidance.

The *Marsh* settlement

EPA’s current prominence in compensation policy, relative to FWS, is based primarily on the Corps’ gradual concession that the 1980 EPA Guidelines are binding on the Corps permit program. This recognition was slow in coming, and for a period in the 1980s it looked as if the Guidelines would become irrelevant. During the first term of the Reagan Administration, federal agencies acted under formal regulatory directives (and informal political directives) to reduce the coercive nature of environmental regulation. In the case of Section 404, this took the form of Corps resistance to using EPA’s environmental criteria to issue permits.⁴ Early in Reagan’s first term, the Presidential Task Force on Regulatory Relief identified the Section 404 regulatory program as “a priority program for review” (Glubiak et al. 1986, p. 146). In response to this, the Corps proposed rules in July of 1982 (Corps 1982) that would allow their public interest review to supersede application of the Guidelines (McChesney 1983). Likewise, in August 1982 the EPA announced a (never-completed) overhaul of the Guidelines that would have dramatically reduced their

³ “This article helped memorialize the description as a 3-step process. For a time, everyone who wrote on the subject after this article used the Race and Christie description or a slight variation of it.” EPA Region 1 staff member, personal communication 6/8/07.

⁴ EPA staff from the early 1980s (personal communication) note that the Corps’ refusal to consider EPA’s environmental criteria was abetted by the suppression of staff activities by EPA’s political leadership during the early Reagan Administration.

mitigation requirements (EPA 1982). The revised May 1983 version of the Corps' proposed rules, in fact, omitted any mention of EPA's 404(b)(1) Guidelines from the permit program altogether (Corps 1983). However, an ensuing lawsuit (*NWF v. John O. Marsh* [22 Env.Rep.Cases 1417]) was settled out of court in February 1984 [14 ELR 20262], and the Corps reversed course by proposing revised regulations in March 1984 (Corps 1984a) that confirmed that the Guidelines are mandatory.

The *Marsh* settlement would seem to be the end of the story concerning the status of the Guidelines. However, only three days prior to their *Marsh*-affirming rule, the Corps issued regulatory guidance stating that “any EPA determinations of compliance with the §404(b)(1) guidelines are to be considered advisory only” (Corps 1984b). While true in a strict sense, it implied a flexibility in Corps compliance with the Guidelines that hardly reflected the spirit of *Marsh*. Reports from the field in the mid-1980s are full of EPA staff complaints that individual Corps districts rarely required adherence to the Guidelines' sequence (often allowing compensation to reduce the amount of impact avoidance and minimization that might be required), and often reversed the direction of the rebuttable presumptions. One senior field staff member wrote that:

It has been our experience that the Corps ignores application of the Guidelines and regularly issues permits for activities in wetlands which are non-water dependent and for which there are practicable alternatives. The Corps regularly ignores a determination of significant degradation for individual and cumulative effects. This is the major cause of continuing wetland losses (Heinen 1985, p. 2).

Likewise, Corps staff frequently complained that EPA staff failed to clearly apply the Guidelines criteria in their comments on Corps permit applications: “Experience has shown that increasing the coordination and oversight roles of the EPA and other Federal resource agencies does not necessarily improve program management” (Page 1988, p. i). EPA's failure to apply their own regulations in review (and potential veto) of Corps permit decisions has been frustrating for Corps staff who have preferred that EPA “wear the black hat,” which allows the Corps to extract concessions from the permittee without wielding overbearing regulatory

force. This state of affairs was also reflected in a 1988 GAO report (GAO 1988) that clearly blamed both agencies for their failure to apply mitigation requirements and to coordinate enforcement activities.

For its part, the Corps released guidance in 1985 affirming its commitment to consider FWS mitigation recommendations (Corps 1985). Crucially, however, the Corps did not express the mitigation steps as a sequence and held that the Corps is free to “require less or different mitigation.” Finally, the 1986 Corps permit regulations (Corps 1986) established the current standard permit forms and was meant to consolidate the six draft and final permit rules that had been issued since 1982. These regulations expressed full compliance with the *Marsh* settlement, and seemed to subordinate the Corps public interest review to the EPA Guidelines where mitigation was concerned. The 1986 regulations, at 33 CFR 320.4(r), contain a discussion of specific mitigation techniques (Corps 1986, p. 41227). However, the application of these principles in the field continued to be uneven and deeply troubling to some observers. Corps staff continued to insist on the primacy of the public interest review—considered by many to be toothless (Blumm and Zahela 1989)—in the determination of mitigation. Corps leadership declared openly that, “The Corps will not require mitigation beyond that which is necessary to tip the public interest balance so that issuance of a permit would not be contrary to the public interest” (Barrows 1986, p. 11). The *Marsh* settlement and subsequent rulemakings had done nothing to diminish what Houck refers to as the “fullblown, institutional schizophrenia” of Section 404 mitigation: “The EPA views alternatives as preventing all but indispensable dredge and fill. The Corps has viewed them as leverage in a large, permit-bargaining session aimed primarily at ‘mitigation’ (i.e., compensation) conditions to reduce harm” (1989, p. 789; see also Kusler and Groman 1986).

Avoidance: Attleboro Mall and Plantation Landing

The tension between the *Marsh*-affirming 1986 Corps permit regulations and staff mitigation practice in the field came to a head in two cases: Attleboro Mall and Plantation Landing. The Attleboro Mall case concerned a permit application to construct a shopping

mall in a Massachusetts wetland known as Sweeden's Swamp. This case looms large in the history of the Section 404 program for numerous reasons. It is one of only eleven cases in the history of the Section 404 program in which EPA has used its 404(c) "veto" authority over a Corps permit decision.⁵ EPA's Final Determination for this veto action (EPA 1986) is most often remembered for its aggressive stance on impact avoidance through application of the "market entry" principle.⁶ It is also critical for its affirmation of the sequential relationship between the Guidelines' requirement to avoid, minimize and compensate for impacts. In making their application to the Corps, the permit applicant argued (and Corps Headquarters ultimately agreed) that, when the compensation proposal was considered *simultaneously* with its proposed impact, the Sweeden's Swamp site was the least damaging alternative. In its veto of the permit decision, EPA ruled that the LEDPA must be determined *before* compensatory mitigation measures are considered, and that compensation measures are only encouraged "when there are no practicable alternatives other than filling in a wetland for a particular project and the project does not cause significant degradation to aquatic resources" (EPA 1986, p. 2) This clearly articulated the sequence, and after EPA's veto action in this case was upheld in 1988 in *Bersani v. USEPA* [674 F. Supp. 405], Army and EPA put an end to the controversial practice of "buying down the LEDPA" with compensatory mitigation by including the following provision in the 1990 Mitigation MOA:

Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a). (Corps & EPA 1990, p. 3)

Of equal import is the landmark guidance produced by the Army in response to EPA's challenge

⁵ <http://www.epa.gov/owow/wetlands/regs/404c.html>.

⁶ In applying for a permit to construct a shopping mall in a wetland known as Sweeden's Swamp, the Final Determination stated that the applicant must consider alternatives to the wetland fill that were available at the time the permit applicant entered the market for the site, rather than at the time the applicant applied for a permit. And since a less environmentally damaging nearby site had in fact been available at that time, the permit for the Sweeden's Swamp site must be denied.

(or "elevation" under the provisions of Section 404(q)) of the Corps' New Orleans District permit decision in the Plantation Landing case. More than any other case, Plantation Landing brought the actual field practice of mitigation in the Corps into line with the *Marsh* decision and 1986 permit regulations. The 14 pages of General Kelly's "Plantation Landing" memo to the field (Kelly 1989) remain the Army's most vigorous statement of commitment to sound aquatic resource management. In affirming the requirement that all Section 404 permit actions must comply with the Guidelines, the Kelly memo describes the EPA Guidelines as "requiring the Corps' 404 program to protect wetlands and other special aquatic sites from unnecessary destruction or degradation" (Kelly 1989, p. 3).

The document provides essential guidance on the determination of the project's "basic purpose," which guides the application of the rebuttable presumptions in the alternatives analysis. The Plantation Landing memo makes it clear that the Corps should "consider" the views of the applicant regarding his project's purpose and the existence (or lack of) practicable alternatives, but that the Corps must determine and evaluate these matters itself, "with no control or direction from the applicant, and without undue deference to the applicant's wishes" (Kelly 1989, p. 5). This prevents situations in which, for example, the project applicant is allowed to define the "basic project purpose" as "to build a luxury golf-course development on this tract of land," a purpose which would severely restrict the range of practicable alternatives. The Corps might instead find that the "basic project purpose" is "to provide housing," and note that non-aquatic sites are available to fulfill this purpose.

In short, while the Attleboro Mall veto affirms the mitigation sequence, the Plantation Landing guidance defines all of the contextual information on project purpose and alternatives needed to apply the mitigation sequence in specific situations. The following synopsis captures some of its breadth:

Leaving nothing to chance, the April [Kelly] memorandum recapitulates its guidance for consideration of the Plantation Landing application 'and comparable future proposals.' First, 'each component' of the project must be examined to see if it is 'water-dependent,' in

light of the project's 'basic purpose.' Components that fail this test are presumed to have upland alternatives; they are further presumed to be severable from other water dependent parts of the project. Only if the applicant can rebut these presumptions with 'clear and convincing' evidence – without the supporting arguments of 'costs,' 'demand,' 'negligible impacts,' and 'adequate [compensatory] mitigation' – will the 404(b)(1) Guidelines be satisfied. Houck (1989, p. 798)

Although one could observe that this is nothing more (and nothing less) than the complete affirmation of EPA's interpretation of the Guidelines that had been agreed to in the *Marsh* settlement five years earlier, it was a landmark moment that buried an important hatchet between the two agencies. When the "Mitigation MOA" came out the following year, it summarized and affirmed much of the substance and interpretation of these two cases.

Minimization in the guidelines and in practice

As previously noted, the Guidelines' impact minimization requirement is found in Section 230.10(d), which states that: "...no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem."⁷ A variety of minimization measures are described in Section 230.75 (Subpart H) of the Guidelines including: changing the location of the discharge, changing the material to be discharged, controlling the material after discharge, changing the method of dispersion, changing the technology used, and changing the affects on plants, animals, and human uses.⁸ Written prior to the development of low-impact design and the "green building" movement, many of these measures narrowly address the specific environmental impacts associated with the disposal of river and harbor dredge spoil. Only very general language is provided regarding minimization for activities such as residential, commercial and industrial development, activities that currently

generate the vast majority of permit applications. This gap between the rather outdated language in the Guidelines and currently-feasible measures has created uncertainty regarding what actions can be required as "appropriate and practicable" minimization under the Guidelines.

Minimization has received little regulatory attention in the intervening years since 1980. A small paragraph on minimization in the 1990 MOA merely reiterates the provisions of the Guidelines. In an aborted rulemaking process that would have exempted Alaska from the sequence, the preamble to the rule retraction directs that minimization is performed "by making changes in project design or construction methods that reduce overall project impacts" (EPA 1994, p. 26162). Noting the lack of guidance on appropriate minimization measures for many activities commonly subject to regulation under Section 404, Houck (1989, p. 836) observed that "What the present program lacks is an identification of 'best available technology' that creates the presumption against which exceptions, where necessary in individual cases, can be made."

Compensation

Compensatory mitigation is so central to discussions of mitigation that "compensation" is often mistakenly held to be synonymous with "mitigation," even among the most experienced observers of the program. It has been described as "the most seductive concept in the field of wetlands protection" (Houck 1989, p. 836) because of the temptation to resolve tough permit decisions by seeking more aggressive compensation packages from permit applicants, rather than by fully exploring avoidance and minimization (Yocom et al. 1989; Kruczynski 1990; Race and Fonseca 1996; Ciupek 1986). These concerns are only exacerbated by the uneven track record of compensation site establishment and doubts regarding the ability of compensatory mitigation to actually offset permitted losses (see a compilation of studies in NRC 2001, p. 190). Nevertheless, Corps permits allow impacts to approximately 22,000 acres each year to wetlands and other aquatic resources. To offset these annual losses, permit recipients are required to provide between 40,000 and 60,000 acres

⁷ 40 C.F.R. §230.10(d) (2006).

⁸ 40 C.F.R. §230.70–77 (2006).

of compensatory mitigation.⁹ A recent report estimates that providing this compensation generates economic transactions totalling approximately \$2.95 billion annually (ELI 2007).

Methods

The compensatory mitigation required by the resource agencies generally fits within four methods (Corps and EPA 2008): the *establishment* of a new aquatic site; the *restoration* of a previously-existing aquatic site; the *enhancement* of an existing aquatic site's functions, or the *preservation* of an existing aquatic site (usually through acquisition). Annually, over 65% of compensation takes the form of restoration and enhancement (Wilkinson and Thomson 2006). The federal resource agencies have a long-standing preference for the use of restoration over the other methods of compensation because it has the greatest potential for replacing both lost aquatic resource functions and area, thus ensuring that the "no net loss" goal (see below) is met (Corps and EPA 1990, 2002; Corps et al. 1995). Establishment can also replace lost aquatic resource functions and area, and has commonly been used to offset permitted impacts; however, its use has decreased over the last 15 years due to concerns over a high project failure rate and the loss of significant upland habitat. There are also concerns with the use of enhancement, which can offer functional improvements but does not replace lost acreage. Finally, compensation through the simple preservation of intact aquatic resources has often been viewed skeptically, because preservation replaces neither lost functions nor lost acreage, and thus does not contribute to meeting the "no net loss" goal. However, the preservation of an intact wetland may be accepted as compensation if, for example, the preserved site is of exceptional quality and possesses some unique, rare or threatened ecological characteristics (Corps and EPA 1990, 2002; Corps et al. 1995). Moreover, preservation recognizes that regulatory programs in general, and the 404 program in particular, cannot and do not protect aquatic resources from all of the sources of degradation that affect them. Some notable examples are sea level rise, future permit applications, non-point sources of pollution, erosion, invasive species, and the cumulative effects of human disturbance.

⁹ Personal communication between Russell Kaiser and Palmer Hough 4-19-07.

Mechanisms

There are three mechanisms for providing compensatory mitigation under the Section 404 program: permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation. *Permittee-responsible mitigation* is the most traditional form of compensation and still represents the majority of the compensation acreage provided each year (Wilkinson and Thomson 2006). It involves the restoration, establishment, enhancement or preservation of aquatic resources undertaken by a permittee (or a contractor hired by the permittee) in order to compensate for impacts resulting from a specific project. As its name suggests, responsibility for completing the work and ensuring success remains with the permittee.

A *mitigation bank* is a wetland or stream compensation area which is set aside to compensate for multiple development activities. The amount of compensation a bank can offer is determined by quantifying the aquatic resources restored or created in terms of "credits." Permittees, upon approval by regulatory agencies, can acquire these credits to meet their compensatory mitigation requirements. The mitigation banker is ultimately responsible for the success of the compensation project.

The first banks were non-commercial ventures, created in the early 1980s by state departments of transportation and other large-scale permit applicants to satisfy their own projected compensation needs. The first commercial sale of banked Section 404 compensation credits occurred at the LaTerre Bank in southern Louisiana on February 2, 1986. The LaTerre Bank, though, was founded in 1982 primarily to provide in-house credits for the Tenneco Oil Company, and did not frequently sell credits to other permittees. Federal advocacy of a fully-realized market approach, in which third-party providers would invest capital in the production of wetland credit commodities for sale at a negotiated price, began in earnest with a 1990 EPA workshop on the future and structure of mitigation banking policy (EPA 1990, Unpublished Manuscript). However, perhaps due to divergent policy interests and inter-agency conflicts, major White House policy pronouncements on wetlands (DPC 1991; WHOEP 1993) seemed to envisage banking as an activity in which state agencies, not entrepreneurs, would create wetland credits for sale. Nonetheless, entrepreneurial

banking moved forward: the first fully entrepreneurial banking venture, the Millhaven Bank in Georgia, was permitted on December 18, 1992; the first sale of compensation credits from an entrepreneurial bank occurred at Florida's Pembroke Pines Bank on January 4, 1994. The series of reports on mitigation banking between 1992 and 1995 by the Corps Institute for Water Resources (IWR) (e.g., Brumbaugh and Reppert 1994; Shabman et al. 1994) gave further agency sanction to the practice. With the issuance of the 1995 Banking Guidance (Corps et al. 1995), third-party producers sensed that conditions were stable for profit to be made more reliably, and the number of entrepreneurial banks expanded dramatically (Robertson 2006). A 2005 inventory estimated that there are approximately 363 active banks, 75 sold-out banks, and an additional 169 proposed banks under review (Wilkinson and Thompson 2006). About 78% of these banks are for-profit entrepreneurial ventures.

While the ecological performance of banks is widely supposed to be higher than that of other forms of compensation, this is largely a matter of anecdote and there is little comparative data to support this claim (but see objective evaluations in Robertson 2006; Robertson and Hayden 2008; Mack and Micacchion 2006; Spieles 2005; Ruhl and Salzman 2006; Reiss et al. 2007). However, it is indisputable that wetland banking has resolved many intractable problems associated with permittee-responsible mitigation. Most significantly, the consolidation of many compensation activities into one large site has made it possible for Corps regulators to easily monitor and evaluate compensation site compliance. Banking has also resulted in the establishment of trust-based relationships between regulators and competent bankers with considerable, and repeatedly-demonstrated, expertise in habitat restoration. This has significantly improved the general level of confidence in banking among regulators as well as some environmentalists.

In-lieu fee mitigation occurs when a permittee provides funds to an in-lieu fee sponsor, generally a public agency or nonprofit organization, to satisfy a compensation obligation. The in-lieu fee sponsor pools these funds and eventually uses them to construct compensation projects. As with mitigation banks, the in-lieu fee sponsor is responsible for the success of these compensation projects. The use of in-lieu-fee compensation expanded through the 1990s

but assumed a variety of different forms. Some Corps districts required in-lieu fee providers to establish detailed agreements resembling mitigation banking agreements, while other districts approved the ad-hoc use of fees with no formal agreement in place concerning how the money was to be spent. Frequently, in-lieu fee arrangements did not require the future compensation sites to be identified or secured. Often the money was never spent, or it was raided by state governments in deficit, or the amount paid was later found to be inadequate to the development of appropriate compensation sites (Gardner 2000). Confusion regarding the appropriate administration of in-lieu fees, and concerns that collected funds were not ultimately providing tangible compensation projects in the ground, prompted the Government Accountability Office to launch an independent evaluation of in-lieu fee mitigation in 2000 (GAO 2001). The federal resource agencies published guidance on the establishment and use of in-lieu fee compensation arrangements later that same year (Corps et al. 2000). The number of in-lieu fee programs dropped from a high in 2001 of 87 programs to a total of 46 programs in 2005 (Wilkinson and Thompson 2006), although this was due in part to the recategorization of some in-lieu fee programs as banks.

While over half of compensatory mitigation completed each year continues to be permittee-responsible compensation, in recent years, use of mitigation banks has rapidly expanded and these banks currently provide over one-third of the annual compensation acreage with in-lieu fee compensation providing an additional eight percent (Wilkinson and Thompson 2006).

The focus on compensation

No net loss

As the Section 404 provisions were being formulated in the 1970s, no one knew the nature or magnitude of wetlands losses—only that they were large, continuing, and significant. Using the recently-developed Cowardin classification (Cowardin et al. 1979), the FWS National Wetlands Inventory was tasked with producing a clear-eyed assessment of the state of wetlands loss. The first report was published in 1983, indicating that between the 1950s and 1970s, the

continental US had lost an average of 439,000 acres per year (Frayer et al. 1983). This number clearly staggered some observers, and 10-year “Status and Trends” reports on wetlands loss were mandated by the 1986 Emergency Wetlands Resources Act. The first of these, in 1990, was a more comprehensive study of wetland loss between the 1780s and 1980s and found that wetland loss over the period since American independence had occurred at the astonishing rate of 60 acres per hour (Dahl 1990).

Partly in response to the 1983 Status and Trends report, EPA Administrator Lee Thomas called on the Conservation Foundation to convene a National Wetlands Policy Forum (NWPf), in order to provide a multi-stakeholder, comprehensive set of recommendations to address the newly-quantified crisis of wetlands loss. Meeting in 1987, the Forum was led by former New Jersey Gov. Thomas Kean, whose state had been the first to require “no net loss” of wetlands in 1985 (Kantor and Charette 1988). The NWPf resulted in a slender volume (Conservation Foundation 1988) with two central recommendations: (a) the adoption of a national policy of “no net loss” and long term net gain of wetlands, and (b) increased emphasis on state assumption of the 404 permit program. While the second recommendation has largely been recognized as impractical and dubiously beneficial (see Houck and Rolland 1995), the first recommendation resonated strongly:

As one of the staff to Interior’s representative and an observer of the year-long deliberations, I thought nothing useful could possibly emerge from the diverse positions and partisan bickering. So much for my predictive powers. The forum produced a consensus report, albeit with largely unrealistic recommendations, a landmark, comprehensive examination of wetland issues, and an appealing slogan, ‘No Net Loss of Wetlands’ (Goldstein 1991, p. 2).¹⁰

¹⁰ Other observers consider Goldstein to have been an overly-cynical analyst of the situation. One anonymous source recalls that “With such a large number of recommendations, they did indeed span a spectrum from things already being done to things that probably never could be. Many of them served to focus discussion among the diverse interests, public and private, and many helped underpin work that EPA and others had long hoped to undertake but lacked budget and/or management support.”

Even so, this report might have gone unnoticed except for the fact that there was a closely-fought Presidential campaign going on in which Vice-President George Bush was running only slightly ahead of Massachusetts Governor Michael Dukakis. The Bush campaign needed a strategy to defuse the post-Democratic Convention surge of support Dukakis experienced in August. Bush seized on the “no net loss” (NNL) slogan, and throughout August 1988 wetland advocacy became one of Bush’s central themes, with “no net loss” as “an integral part of campaign rhetoric” (Goldstein 1991, p. 1). As official policy, NNL was launched on June 8, 1989 when President Bush advocated the achievement of no net loss of wetlands in a major policy address to Ducks Unlimited:

...generations to follow will say of us 40 years from now... that sometime around 1989 things began to change and that we began to hold on to our parks and refuges and that we protected our species and that in that year the seeds of a new policy about our valuable wetlands were sown, a policy summed up in three simple words: “No net loss.” (USGPO 1989, p. 694)

While NNL as an abstract accounting concept was applied to many areas of wetland policy, it had the particular effect of highlighting compensation within the Section 404 permit program. NNL provided the key notion of a “net” accounting of wetlands loss, which directly focuses policy on the importance of compensation. When environmentalists cheered the NNL policy, they acquiesced to the notion that wetland protection was not merely to be achieved through the denial of permits, or even the avoidance and minimization of impacts, but rather through allowing impacts and requiring compensation.

The period from 1988 through 1993—roughly from the release of the NWPf report to the release of Clinton’s “Flexible and Fair” wetland policy (WHOEP 1993)—marks a golden age in the speed and frequency of developments in mitigation policy, and a confluence of many separate debates. In this time, a critical mass of scientific reports on the inadequacy of compensatory mitigation was crowned with the landmark Erwin (1991) report on Florida, a national debate over the scientific methods by which wetlands were identified and delineated produced three competing delineation manuals, and a flurry of

legislative activity attempted to put “no net loss” into the CWA. All attempts to legislate “no net loss” ultimately failed, and the only legislative vestige of the NNL debate is found in the 1990 Water Resources Development Act (WRDA), which, alongside authorizing a slew of water development projects, officially made “environmental protection” a primary mission of the Corps (WRDA §12(a)).

The 1990 WRDA contained another response to the crisis quantified in the Status and Trends reports: authorization of an NRC study which became *The Restoration of Aquatic Ecosystems* (NRC 1992), a crucial summary of the science underpinning our ability to manipulate and restore aquatic resource functions and values. Alongside *Wetland Creation and Restoration: The Status of the Science* (Kusler and Kentula 1990), it served as a strong cautionary note from the scientific community on the limits of compensatory mitigation to restore and replace lost wetland functions even under ideal circumstances.

Finally, as noted above, the years 1989 and 1990 marked an outbreak of peace between the Corps and EPA over the interpretation of the 404(b)(1) Guidelines. In addition to the Kelly memo, the two agencies issued joint memoranda on enforcement, jurisdictional determinations, and—most crucially—on mitigation procedures.

1990 Mitigation memorandum of agreement (MOA)

Although EPA and the Corps had been drafting and redrafting joint mitigation guidance since 1985 in response to the *Marsh* settlement, they finally entered into an MOA on mitigation in February 1990 (Corps and EPA 1990). It interprets key provisions in the Section 404(b)(1) Guidelines to establish the policies and procedures to be followed in determining what mitigation is necessary for compliance with Section 404. The MOA embraces the national “no net loss” goal and uses the three-step sequence to clarify, for standard permits, the relationship between the Guidelines and the original 1978 CEQ definition of mitigation. It is impossible to overstate the importance of the 1990 MOA in reframing the entire debate over mitigation, and in giving us the current meaning of nearly all of the concepts that characterize mitigation. In the MOA, EPA and the Corps agree

that mitigation for standard permits proceeds in a sequence such that:

- Aquatic resource impacts must be avoided “to the maximum extent practicable,”
- Unavoidable impacts must be minimized “to the extent appropriate and practicable” and
- Remaining impacts must be compensated for “to the extent appropriate and practicable” (Corps and EPA 1990, p. 2).

Section II.C.3 of the MOA, which describes the compensation step, includes a general preference for aquatic resource restoration over other forms of compensation such as creation. It also incorporates the preferences for “in-kind” compensation and for compensation to occur on or adjacent to the impact site (i.e., “on-site” compensation) that had first been articulated by FWS in 1981. In its brief reference to the emerging practice of mitigation banking, the MOA suggests that use of a mitigation bank fulfills the on-site and in-kind preferences, “regardless of the practicability of other forms of compensatory mitigation.” While this provision has rarely been cited in subsequent discussions over mitigation banking policy, it is clear that the authors of the MOA envisioned an important role for mitigation banking well before the emergence of a national industry and the widespread usage of banks.

The MOA also put boundaries on the concept of mitigation: its application has limits and it cannot cure all ills. If a mitigation plan which is necessary to ensure compliance with the Guidelines is not reasonably implementable or enforceable, the permit must be denied. Furthermore, it stipulates that some projects have impacts that are “so significant that even if alternatives are not available, the discharge may not be permitted regardless of the compensatory mitigation proposed” (Corps and EPA 1990, p. 4). Permit denials are vanishingly rare (only 0.25% of all permit applications were denied in 2004 and 2005)¹¹, and regulatory staff may struggle to remember the last time a permit was denied solely for lacking an implementable or enforceable compensation plan, or because remaining significant degradation was simply uncompensatable. However, the language is

¹¹ Personal communication between Russell Kaiser and Palmer Hough 4-19-07.

strong and may acquire more practical meaning in the future.

Categorization

Almost since the mitigation Guidelines were first articulated in 1980, there have been attempts to find shortcuts through their requirements based on the condition or type of wetland being impacted. These attempts have usually been considered under the general rubric of “categorization” or “prioritization,” and flourished in two distinct periods: circa 1985 and circa 1992.

The policy enthusiasm for categorization in the mid-1980s was inspired by the perceived need to make the Section 404 permitting process less onerous by limiting the application of the Guidelines to certain “high-valued” categories of wetlands (Baldwin 1985; EPA 1985). Regional staff expressed that they were “nervous with categorization,” pointing out that, as a practical matter, categorization was mainly being promoted as a method of determining which kinds of wetlands should *not* be protected by the provisions of the Guidelines, at a time when the mandatory application of the Guidelines in *any* situation was still contested. The notes from a staff briefing on categorization reveal the frustration caused by a focus on categorization: “limiting factor on wetland protection [is] not identifying important wetlands, but getting Corps to implement [the 404] (b)(1) Guidelines as written. Isn’t this ducking issue?” (EPA 1985). Categorization seemed to be serving as a distraction from a fundamental issue: the Corps was not applying the Guidelines in the first place. It appears that the initiative was dropped as the “no net loss” narrative emerged in 1987 and 1988.

Wetland categorization re-emerged in 1991, however, coinciding with the rise of enthusiasm for market-based approaches. EPA began by internally mooting the idea that permits to impact “low-quality” wetlands should be allowed to skip the avoidance and minimization steps. Skipping directly to the compensation step was seen to increase demand for compensation credits, and thus to support the development of a market in wetland compensation. Thus, mitigation banking was explicitly linked with the notion of circumventing the sequence through the categorization of wetlands. In August 1991, the White House issued Vice-President

Quayle’s Domestic Policy Council Task Force on Wetlands (DPC 1991), a comprehensive wetland policy plan that directed an interagency technical committee to “refine the details of a market-oriented mitigation banking system based on the categories it defines” (WHOPS 1991). In 1992, EPA developed draft rules (EPA 1992) (later abandoned) that would have implemented many of the recommendations of the DPC report. Most importantly, the draft rules adopted a three-tier categorization of wetlands that would restrict the application of the mitigation sequence only to the highest-quality tier, while the lower two tiers would jump directly to the “compensation” step. This approach explicitly promoted wetland banking as the preferred way to compensate for impacts in the lower two tiers of wetland quality (EPA OPPE 1991). The association between banking and the circumvention of the sequence has persisted in the minds of suspicious environmental advocates for years after the rule’s abandonment in 1993. Although categorization resurfaced briefly in the 104th Congress, under the Clinton Administration the categorization debate evolved into a more sophisticated debate concerning the application of the Hydrogeomorphic Method (HGM) to classify wetland types, and moved away from the notion of prescribing different mitigation approaches to different categories of resource quality (Brinson 1996).

Recent developments in mitigation

2001 NRC report

The continued relevance of mitigation has been reflected in every recent effort to evaluate the Section 404 program. Under the Clinton Administration’s 1998 Clean Water Action Plan (CWAP), EPA and the Corps tasked the NRC in 1999 with evaluating the effectiveness of compensatory mitigation. This study was called for by the CWAP in order to “comprehensively evaluate the effectiveness of each of the compensatory mitigation alternatives (i.e., permittee-responsible mitigation, mitigation banks and in-lieu fee mitigation) in terms of compliance with permit conditions and achievement of ecological success, and to produce a report that allows conclusions to be drawn about the relative effectiveness of the various options” (EPA, n.d.). Due to resource constraints, the

scope of the study was narrowed by dropping the detailed comparison among compensation mechanisms. Despite its narrowed focus on compensation, the 2001 NRC compensation study is the most comprehensive evaluation to date regarding compensatory mitigation. The 322-page report's primary conclusion is a sobering one: despite progress in the last 20 years, "the goal of no net loss of wetlands is not being met for wetland functions by the mitigation program" (NRC 2001, p. 2). The report provides a comprehensive inventory of the shortfalls of compensation and identifies a suite of technical, programmatic, and policy recommendations for the Federal agencies, States, and other parties involved in compensation.

2002 National wetlands mitigation action plan

Largely in response to the comprehensive NRC compensatory mitigation report, EPA, the Corps, and the Departments of Agriculture, Commerce, Interior, and Transportation released the National Wetlands Mitigation Action Plan (NWMAP) on December 26, 2002 (Corps et al. 2002). The NWMAP included 17 tasks designed to improve the ecological performance and results of compensatory mitigation, but largely neglected the avoidance and minimization aspects of mitigation. At the time of press, eight of the tasks called for in the NWMAP had been completed including the release of a revised Corps Regulatory Guidance letter on compensatory mitigation (Corps and EPA 2002), a national model mitigation plan checklist (Corps and EPA 2003), and national guidance formally adopting the NRC's *Operational Guidelines for Creating and Restoring Self-Sustaining Wetlands* (Corps 2003). Work continues on efforts to improve wetland impact and mitigation data collection and tracking. However, work on the remaining guidance documents called for in the NWMAP has awaited finalization of the joint Corps/EPA rulemaking which is discussed in more detail below.

2005 GAO report

Corps oversight of compensatory mitigation has been a recurring topic of GAO investigations, with reports in 1988 and 1993. The most recent installment in 2005 was provocatively entitled *Corps of Engineers*

does not have an Effective Oversight Approach to Ensure that Compensatory Mitigation is Occurring (GAO 2005). According to this report "The Corps' priority has been and continues to be processing permit applications," and in explicit comparison with GAO's 1988 report, "... little has changed" (GAO 2005, p. 27). GAO's 2005 evaluation reviewed Corps guidance on the oversight of compensatory mitigation, the extent to which Corps staff actually observe compensation sites, and the nature of Corps enforcement of compensatory mitigation requirements. The report's general findings are threefold: Corps guidance on compensation oversight is vague and inconsistent, oversight is lax, and enforcement of compensatory mitigation permit conditions is rare. GAO concluded that, "Until the Corps takes its oversight responsibilities more seriously, it will not know if thousands of acres of compensatory mitigation have been performed and will be unable to ensure that the section 404 program is contributing to the national goal of no net loss of wetlands" (GAO 2005, p. 27).

Compensation rule

On April 10 2008, in response to a Congressional directive, EPA and the Corps issued a rule (Corps and EPA 2008) designed to improve compensation by creating equivalent standards that apply to all forms of compensation. This rule attempts to respond to the recommendations in NRC (2001) by requiring clear performance standards, administrative procedures and the use of available wetland scientific knowledge. The rule's standards for all compensatory mitigation are similar to the provisions that have been in place for mitigation banks since the 1995 banking guidance, and include: the use of real estate instruments to protect the compensation site; the funding of financial assurances for near- and long-term site stewardship; implementation of monitoring and contingency planning; and the clear identification of parties responsible for project tasks. Though not without implementation flaws, mitigation banking was seen as a model to guide the reform of other compensation mechanisms because banking is the only compensation mechanism that is "performance-based": all other types of compensation involve impacts occurring before compensation sites have achieved any

performance standards or satisfied any administrative criteria.

EPA and the Corps analyzed and summarized more than 12,000 public comments received on the proposed version of the rule issued for public comment in March of 2006. Tellingly, the substantive interest expressed most frequently among individual comment letters was not about compensation at all. Rather, commenters' dominant concern was that the Corps and EPA must maintain their commitment to the avoidance and minimization steps in the mitigation sequence.

Conclusion

The story of wetland mitigation consists of many interweaving lines of debate. Contention over EPA's role began with EPA's 1975 Guidelines, ran through the 1978 CEQ rules, the 1980 Guidelines, the *Marsh* settlement, the 1986 Corps rules and finally to the Attleboro/Plantation Landing decisions and the 1990 MOA. The call for "no net loss" of wetlands originated in the National Wetlands Inventory, which was first reported in the 1983 Status and Trends report, continued through the 1987 National Wetland Policy Forum and the 1988 presidential campaign to the 1990 WRDA and 1990 MOA, culminating in the 2001 NRC and 2005 GAO findings that the goal has proven elusive. The technical practices of creating wetland compensation sites had their origins in the Corps' Dredged Material Research Program, but were quickly embroiled in debates surrounding the publication of many negative compensation site evaluations in the 1980s, which led to crucial state-of-the-science summaries in 1990 and 1992, and the need for NRC's 2001 report. The sequence, categorization and wetland banking can all be traced back to FWS's 1981 response to the 1978 CEQ rule, which found a way to formulate mitigation recommendations efficiently enough that the Corps could not ignore them. The role of FWS, which originally dominated the mitigation policy arena, has tended to diminish as the power of EPA's 404(b)(1) Guidelines has been affirmed and elaborated. Over the past 30 years, the original expansive five-part definition of mitigation has tended to be reduced, for lay users, to one component: compensation.

Over the 36-year history of the Section 404 program, EPA and the Corps have made great strides in developing and refining the program's mitigation requirements and associated policy. The federal resource agencies have supported dozens of small and large-scale evaluations of the third step in the sequence, compensation, to help them understand its strengths and weaknesses. Based on the lessons learned and recommendations from these studies, the resource agencies have also generated over a half dozen national guidance documents¹² designed to elevate the success rate of compensation. This sustained focus on improving compensation has yielded tangible results, the most important of which from a policy standpoint are the final compensatory mitigation regulations issued in 2008. A motivated focus on improving the effectiveness of avoidance and minimization could yield similar tangible results, but there has been almost no work carried out on these subjects from either policy or ecological perspectives. This is an increasingly glaring omission. As Houck (1989, p. 838) reminds us, compensation "is a measure of last, not first, resort. Until this principle is actually implemented by permit review staffs, the concept of (compensation) will continue to wag the dog, pointing it away from those hard and necessary decisions that will avoid wetlands loss." To judge by the comments received on the compensation rule, it appears the public agrees with the National Research Council, which defined avoidance as "the first and most desirable of the sequencing steps in wetland mitigation" (NRC 2001, p. 299). We look forward to the important work that will aid in the effective implementation of all three steps in the mitigation process.

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¹² See the National Compensatory Mitigation Guidance List: <http://www.mitigationactionplan.gov/links.html>.

References

- Baldwin MF (1985) Establishing a wetland protection system under EPA's wetland protection and review authorities: a concept paper prepared for the Environmental Protection Agency, Office of Federal Activities, March 1985. EPA contract No. 68-01-6558, Subcontract No. 130.164. Baldwin Associates, Great Falls, VA, 43 pp
- Barrows DB (1986) Mitigation in the Army Corps of Engineers regulatory program. *National Wetlands Newsl* 8(5):11–12
- Blumm MC, Zaleha DB (1989) Federal wetlands protection under the Clean Water Act: regulatory ambivalence, intergovernmental tension, and a call for reform. *Univ Colo Law Rev* 60:695–772
- Brinson MM (1996) Assessing wetland functions using HGM. *National Wetlands Newsl* 18(1):10–21
- Brown JD (1989) Wetlands mitigation: US Fish and Wildlife Service policy and perspectives. In: Sharitz RR, Gibbons JW (eds) *Freshwater wetlands and wildlife*. USDOE Office of Scientific and Technical Information, Oak Ridge, pp 861–868
- Brumbaugh RW, Reppert R (1994) National wetland mitigation banking study: first phase report. Report IWR 94-WMB-4. US Army Corps of Engineers Institute for Water Resources, Alexandria, VA
- CEQ [Council on Environmental Quality] (1978) National environmental policy act—regulations: implementation of procedural provisions. *Fed Regist* 43:55977–56007
- Ciupek RB (1986) Protecting wetlands under Clean Water Act Section 404: EPA's conservative policy on mitigation. *National Wetlands Newsl* 8(5):12–13
- Conservation Foundation (1988) Protecting America's wetlands: an action agenda. The final report of the National Wetlands Policy Forum. The Conservation Foundation, Washington DC
- Corps [US Army Corps of Engineers] (1968) Part 209—administrative procedure: revision of Part. *Fed Regist* 33:18670–18693
- Corps [US Army Corps of Engineers] (1973) Permits for activities in navigable waters or ocean waters. *Fed Regist* 38:12217–12230
- Corps [US Army Corps of Engineers] (1982) Interim Final Rule for Regulatory Programs of the Corps of Engineers. *Fed Regist* 47:31794–31834
- Corps [US Army Corps of Engineers] (1983) Proposal to amend permit regulations for controlling certain activities in waters of the United States. *Fed Regist* 48:21466–21476
- Corps [US Army Corps of Engineers] (1984a) Proposal to amend permit regulations for controlling certain activities in waters of the United States. *Fed Regist* 49:12660–12664
- Corps [US Army Corps of Engineers] (1984b) EPA's role in determining compliance with sec 404(b)(1) Guidelines. *Regulatory Guidance Letter* 84–06, issued 26 March 1984, Washington DC
- Corps [US Army Corps of Engineers] (1985) Implementation of Fish & Wildlife mitigation in the Corps of Engineers regulatory program. *Regulatory Guidance Letter* 85-08, issued 11 November 1985, Washington DC
- Corps [US Army Corps of Engineers] (1986) Final rule for regulatory programs of the Corps of Engineers. *Fed Regist* 51:41206–41260
- Corps [US Army Corps of Engineers] (1991) Final rule for nationwide permit program regulations and issue, reissue and modify nationwide permits. *Fed Regist* 56:59109–59147
- Corps [US Army Corps of Engineers] (2003) Memorandum to the field: model “Operational guidelines for creating or restoring wetlands that are ecologically self-sustaining” for aquatic resource impacts under the Corps regulatory program pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. <http://www.mitigationactionplan.gov/nas404program.pdf>. Cited 10 May 2007
- Corps [US Army Corps of Engineers] (2006) Draft environmental assessment, finding of no significant impact, and regulatory analysis for proposed compensatory mitigation regulation. US Army Corps of Engineers, Washington DC
- Corps [US Army Corps of Engineers] (2007) Reissuance of nationwide permits. *Fed Regist* 72:11092–11198
- Corps [US Army Corps of Engineers], EPA [US Environmental Protection Agency] (1989) Memorandum of Agreement between the Department of the Army and the Environmental Protection Agency concerning the determination of the Section 404 Program and the application of the exemptions under Section 404(f) of the Clean Water Act. Signed 19 January 1989, Washington DC
- Corps [US Army Corps of Engineers], EPA [US Environmental Protection Agency] (1990) Memorandum of Agreement Between The Department of the Army and The Environmental Protection Agency: The Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines. Signed 6 February 1990, Washington DC
- Corps [US Army Corps of Engineers], EPA [US Environmental Protection Agency] (2002) Guidance on compensatory mitigation projects under the Corps Regulatory Program pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. *Regulatory Guidance Letter* 02-2, issued 24 December 2002, Washington DC
- Corps [US Army Corps of Engineers], EPA [US Environmental Protection Agency] (2003) Multi-agency compensatory mitigation plan checklist. <http://www.mitigationactionplan.gov/checklist.pdf>. Cited 10 May 2007
- Corps [US Army Corps of Engineers], EPA [US Environmental Protection Agency] (2008) Compensatory mitigation for losses of aquatic resources. *Fed Regist* 73:19594–19705
- Corps [US Army Corps of Engineers], FWS [US Fish and Wildlife Service] (1967) Memorandum of Agreement between Secretary of the Army Stanley Resor and Secretary of the Interior Stewart Udall. 13 July 1967, Washington DC
- Corps [US Army Corps of Engineers], US Environmental Protection Agency, US Fish and Wildlife Service, National Marine Fisheries Service, Natural Resources Conservation Service (1995) Federal guidance for the establishment, use and operation of mitigation banks. *Federal Register* 60:58605–58614

- Corps [US Army Corps of Engineers], US Environmental Protection Agency, US Fish and Wildlife Service, National Oceanic and Atmospheric Administration (2000) Federal guidance on the use of in-lieu-fee arrangements for compensatory mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers Harbors Act. Signed 26 May 2000, Washington DC
- Corps [US Army Corps of Engineers], US Environmental Protection Agency, US Fish and Wildlife Service, National Oceanic and Atmospheric Administration, US Department of Transportation, USDA Natural Resource Conservation Service (2002) National Mitigation Action Plan. Issued 24 December 2002. <http://www.mitigationactionplan.gov/map1226withsign.pdf>. Cited 10 May 2007
- Cowardin LM, Carter V, Golet FC, LaRoe ET (1979) Classification of wetlands and deepwater habitats of the United States. USFWS Office of Biological Services, Washington DC
- Dahl TE (1990) Wetlands losses in the United States 1780s to 1980s. US Department of the Interior, Fish and Wildlife Service, Washington DC
- DPC [Domestic Policy Council Task Force on Wetlands] (1991) President's implementation plan. White House Domestic Policy Council, Washington DC
- ELI [Environmental Law Institute] (2007) Mitigation of impacts to fish and wildlife habitat: estimating costs and identifying opportunities. ELI, Washington DC
- EPA [US Environmental Protection Agency] (1975) Part 230—Navigable waters: discharge of dredged or fill material. Fed Regist 40:41291–41298
- EPA [US Environmental Protection Agency] (1980) Guidelines for specification of disposal sites for dredged or fill material. Fed Regist 45:85336–85357
- EPA [US Environmental Protection Agency] (1982) Guidelines for specification of disposal sites for dredged or fill material. Fed Regist 47:36797–36799
- EPA [US Environmental Protection Agency] (1985) Notes from conference call, 3/5/1985. EPA Wetlands Division Mitigation Library file “1985 Prioritization Concept Paper”, Washington DC
- EPA [US Environmental Protection Agency] (1986) Final determination of the Assistant Administrator for External Affairs concerning the Sweedens Swamp site in Attleboro, Massachusetts pursuant to Section 404(c) of the Clean Water Act. Signed 13 May 1986. <http://www.epa.gov/owow/wetlands/regs/404c.html>. Cited 8 April 2007
- EPA [US Environmental Protection Agency] (1992) Section 404(b)(1) Guidelines; revisions regarding sequencing based on a categorization scheme. Fed Regist 57:52056
- EPA [US Environmental Protection Agency] (1994) Exception from wetlands mitigation sequence for Alaska. Fed Regist 59:26162–26167
- EPA [US Environmental Protection Agency]. n.d. Clean Water Action Plan mitigation study, tab 4: proposed scope of study to evaluate the effectiveness of compensatory mitigation options in achieving no net loss. EPA Wetlands Division Mitigation Library file “Clean Water Action Plan”, Washington DC
- EPA OPPE [US Environmental Protection Agency, Office of Planning and Policy Evaluation] (1991) Market-based approach for wetland regulation. Unsigned memo, dated 1 August 1991
- Erwin KL (1991) An evaluation of wetland mitigation in the South Florida Water Management District, vol 1. Methodology. SFWMD, West Palm Beach, FL
- Frayser WE, Monahan TJ, Bowden DC, Graybill FA (1983) Status and trends of wetlands and deepwater habitats in the conterminous United States, 1950's to 1970's. US Department of the Interior, Fish and Wildlife Service, Washington DC
- FWS [US Fish and Wildlife Service] (1981) US Fish and Wildlife Service mitigation policy; notice of final policy. Fed Regist 46:7644–7663
- FWS [US Fish, Wildlife Service] (1983) Interim guidance on mitigation banking. Ecological services instructional memorandum No. 80. USFWS, Washington DC
- GAO [US General Accounting Office] (1988) Wetlands: the Corps of Engineers' administration of the Section 404 program. Report GAO/RCED-88-110. GAO, Washington DC
- GAO [US General Accounting Office] (2001) Assessments needed to determine effectiveness of in-lieu-fee mitigation. Report GAO-01-325. GAO, Washington DC
- GAO [US Government Accountability Office] (2005) Corps of Engineers does not have an effective oversight approach to ensure that compensatory mitigation is occurring. Report GAO-05-898. GAO, Washington DC
- Gardner RC (2000) Money for nothing?: the rise of wetland fee mitigation. VA Environ Law J 19:1–56
- Glubiak PG, Nowka RH, Mitsch WJ (1986) Federal and state management of inland wetlands: are states ready to assume control? Environ Manage 10:145–156
- Goldstein J (1991) Introduction. In: Heimlich RE (ed) A national policy of “no net loss” of wetlands: what do agricultural economists have to contribute? USDA Economic Research Service, Resources and Technology Division, Washington DC, pp 1–3
- Hall JR (1988) A perspective on influencing the Corps of Engineers. In: Kusler JA (ed) Mitigation of impacts and losses. ASWM, Berne, pp 60–65
- Heinen ET (1985) Letter from ET Heinen, EPA Region 4, to J Cooper, EPA Assistant Administrator for External Affairs. 1 May 1985, 8 pp
- Houck OA (1989) Hard choices: the analysis of alternatives under Section 404 of the Clean Water Act and similar environmental laws. Univ Colo Law Rev 60:773–840
- Houck OA, Rolland M (1995) Federalism in wetlands regulation: a consideration of delegation of Clean Water Act Section 404 and related programs to the states. Maryland Law Rev 54:1242–1314
- Kantor RA, Charette DJ (1988) Origin, evolution, and results of New Jersey's wetlands mitigation policy. In: Kusler JA (ed) Mitigation of impacts and losses. ASWM, Berne, pp 103–105
- Kelly P (1989) Memorandum: permit elevation, Plantation Landing Resort, Inc. Signed 21 April 1989. US Army Corps of Engineers, Washington DC, 15 pp. <http://www.epa.gov/owow/wetlands/pdf/PlantationLandingRGL.pdf>
- Kruczynski WL (1990) Mitigation and the Section 404 program: a perspective. In: Kusler JA, Kentula ME (eds) Wetlands creation and restoration: the status of the science. Island Press, Washington DC, pp 549–554
- Kusler JA, Groman H (1986) Mitigation: an introduction. National Wetlands Newsl 8(5):2–3

- Kusler JA, Kentula ME (1990) Wetland creation and restoration: the status of the science. Island Press, Washington DC
- LaRoe ET (1986) Wetland habitat mitigation: an historical overview. *National Wetlands Newsl* 8(5):8–10
- Liebman LR (1984) The role of EPA's guidelines in the Clean Water Act Section 404 permit program—judicial interpretation and administrative application. *Environ Law Rep* 14:10272–10278
- Mack JJ, Micacchion M (2006) An ecological assessment of Ohio mitigation banks: vegetation, amphibians, hydrology and soils. Ohio EPA Technical Report WET/2006-1. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus OH
- McChesney FL (1983) Corps recasts Section 404 permit program, braces for political, legal skirmishes. *Environ Law Rep* 13:10128–10134
- NRC [National Research Council] (1992) Restoration of aquatic ecosystems. National Academy Press, Washington DC
- NRC [National Research Council] (2001) Compensating for wetland losses under the Clean Water Act. National Academy Press, Washington DC
- Page RW (1988) Letter from RW Page, Assistant Secretary of the Army (Civil Works), to J Duffus III, Government Accounting Office. 9 June 1988, 19 pp
- Race MS, Christie DR (1982) Coastal zone development: mitigation, marsh creation, and decision-making. *Environ Manage* 6:317–328
- Race MS, Fonseca MS (1996) Fixing compensatory mitigation: what will it take? *Ecol Appl* 6:94–101
- Reiss KC, Hernandez E, Brown MT (2007) An evaluation of the effectiveness of mitigation banking in Florida: ecological success and compliance with permit criteria. Florida Department of Environmental Protection, Tallahassee. http://www.dep.state.fl.us/water/wetlands/docs/mitigation/Final_Report.pdf
- Robertson M (2006) Emerging ecosystem service markets: trends in a decade of entrepreneurial wetland banking. *Front Ecol Environ* 6:297–302
- Robertson M, Hayden N (2008) Evaluation of a market in wetland credits: entrepreneurial wetland banking in Chicago, USA. *Conserv Biol* (in press)
- Ruhl JB, Salzman J (2006) The effects of wetland mitigation banking on people. *National Wetlands Newsl* 28(2):1, 9–14
- Shabman LA, Scodari P, King DM (1994) National wetland mitigation banking study: expanding opportunities for successful mitigation: The Private Credit Market Alternative. Report IWR 94-WMB-3. US Army Corps of Engineers Institute for Water Resources, Alexandria VA
- Soileau DM (1984) Final report on the Tenneco Laterre Corporation mitigation banking proposal, Terrebonne Parish, Louisiana. US Fish and Wildlife Service, Division of Ecological Services, Lafayette, LA
- Spieles D (2005) Vegetation development in created, restored, and enhanced mitigation wetland banks of the United States. *Wetlands* 25:51–63
- USGPO [United States Government Printing Office] (1989) Congressional record of the 101st congress, vol 135, part 20 (11/8/89 to 11/15/89). GPO, Washington DC
- Webb JW, Landin MC, Allen HH (1986) Approaches and techniques for wetlands development and restoration of dredged material disposal sites. In: Kusler JA, Quammen ML, Brooks RP (eds) Mitigation of impacts and losses. ASWM, Berne, pp 132–134
- WHOEP [White House Office on Environmental Policy] (1993) Protecting America's wetlands: a fair, flexible and effective approach. The White House, Washington DC
- WHOPS [White House Office of the Press Secretary] (1991) Fact sheet: protecting America's wetlands. The White House, Washington DC
- Wilkinson J, Thompson J (2006) 2005 Status report on compensatory mitigation in the United States. Environmental Law Institute, Washington DC
- Wood LD (2004) Don't be misled: CWA jurisdiction extends to all non-navigable tributaries of the traditional navigable waters and to their adjacent wetlands (a response to the Virginia Albrecht/Stephen Nicklesburg ELR article, to the Fifth Circuit's decision in *Re Needham*, and to the Supreme Court's dicta in *SWANCC*). *Environ Law Report* 34:10187–10217
- Yocom TG, Leidy RA, Morris CA (1989) Wetlands protection through impact avoidance: a discussion of the 404(b)(1) alternatives analysis. *Wetlands* 9:283–297