Habitat Mitigation Efforts in the Gulf of Maine:

Stemming the Tide of Environmental Degradation

Prepared for
the Gulf of Maine Council on the Marine Environment

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A report to the Gulf of Maine Council
on the Marine Environment

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INTRODUCTION

The Gulf of Maine Initiative is a cooperative effort between the provinces of Nova Scotia and New Brunswick, the states of Maine and New Hampshire, and the Commonwealth of Massachusetts to protect the ecological integrity of the Gulf ecosystem. It includes the development of a comprehensive environmental monitoring program, a ten-year action plan for coordinated Gulf management, and a significant education component to raise public awareness of the value of the Gulf's resources. A vital part of these preservation efforts entails stemming further environmental degradation by protecting crucial habitat areas and mitigating subsequent damages to them.

The rationale for mitigation is straightforward. Continued utilization of the Gulf's resources will inevitably require encroachments on sensitive marine habitats. The cumulative effects of these impacts can lead to worsened water quality, decreased biological productivity, and reductions in the aesthetic and economic benefits of the Gulf that we all enjoy. However, if the effects of human incursions on the most

ecologically valuable Gulf habitats are limited to the greatest practicable extent, and if any remaining impacts are alleviated by compensatory measures, the Gulf's prognosis improves dramatically. By successfully mitigating environmental damages today, we invest in the future health and stability of this invaluable marine ecosystem.

This study examines current habitat mitigation policies employed by the governments surrounding the Gulf of Maine. By looking at mitigation practices throughout the Gulf, resource managers can broaden their understanding of the challenges of coordinated ecosystem management. Likewise, interested citizens can gain an appreciation of existing laws and policies governing activities which affect crucial Gulf habitats. Lawmakers can benefit from such a study as well, as they strive to improve upon existing policies with the ultimate goal of sustaining the Gulf ecosystem for future generations.

In the report's first section, sensitive habitats are discussed in an attempt to specify exactly which environments are the most critical to the long-term productivity of the Gulf. These key habitats are then related to prevailing concepts of mitigation to assess the scope of mitigation's current and potential application. The result is a fairly comprehensive introduction to Gulf habitat evaluation and the concept of

mitigation, as well as a sense of how mitigation has been -- and could potentially be -- applied to environmental management practices.

Section 2 builds upon the discussion in Section 1 by detailing existing federal and provincial/state habitat mitigation efforts in the Gulf of Maine. Each region's laws, policies, and regulatory procedures dealing with mitigation are presented to document how the system currently works. What are the laws? Who issues permits? How are proposals that affect marine habitat evaluated? These questions are answered as background for Section 3, in which current governmental mitigation efforts are analyzed and compared. Are existing policies adequate? Do resource managers throughout the Gulf apply the same standards for habitat conservation?

Finally, in Section 4, recommendations are presented for future habitat mitigation efforts in the Gulf of Maine. Based upon current policies and methods of implementation, two related factors emerge as necessary precursors to improved habitat mitigation policy: a refinement of existing management strategies, coupled with a renewed effort to achieve consistency in management objectives. It is from that vantage point that ecologically sound and politically coordinated policies can be adopted throughout the Gulf of Maine.

SECTION 1:
AN INTRODUCTION TO HABITATS AND MITIGATION

PART I -- EVALUATING AND DEFINING SENSITIVE HABITATS

One of the most difficult steps involved in protecting especially valuable marine habitats is simply determining which habitats are the most critical. As the communities surrounding the Gulf of Maine embark upon a comprehensive resource conservation campaign, a logical place to begin is with those areas deemed most valuable to the overall health and stability of the ecosystem.

The designation of those areas -- special habitats worthy of concern -- is complex for several reasons. First, when the intent is to preserve an entire ecological unit which includes many different types of habitats, prudent resource management might appear to argue for the inclusion of any and all habitats that contribute to the ecosystem's productivity. However, not every habitat type can be seriously regarded as "critical," and even if each habitat **were** considered critical, some would certainly emerge as being more critical than others.

Secondly, a clear determination that one specific type of habitat is especially important for fish productivity in the Bay of Fundy, for example, does not by itself mean that high fish productivity in Massachusetts Bay is also attributable to that

same type of habitat. In short, despite the relatively enclosed nature of the Gulf of Maine ecosystem, regional differences still exist due to variations in geography, topography, and hydrography. Tidal influences, weather patterns, and geological conditions vary somewhat throughout the Gulf, producing corresponding variations in the localized importance of certain habitat types, such that one given area might not be as reliant on a certain type of habitat as another area is.

A related factor is that the various kinds of coastal habitat found in the Gulf are not distributed uniformly throughout. For instance, salt marshes are more dominant along southern Gulf shores than in northern areas, and thus their relative value varies regionally. Similarly, if a particular harbor is so degraded that the only remaining eelgrass bed is a 0.1 acre plot fraught with debris and pollution, then the intrinsic value of that bed is magnified significantly due to its rarity. The result is that a type of habitat which might be abundant and marginally significant in one area can be endowed with a far more critical status in another area.

In light of these considerations, and in spite of the fact that important habitats are not everywhere the same, the task for coordinated management of the Gulf of Maine is to identify those types of marine habitat that are the most vital and prolific contributors to its overall productivity. It is true that

certain kinds of habitat might not be valued (or even found) in every cove, inlet, and estuary in the Gulf, and the designation of a given habitat type as "important" might not apply with equal force everywhere. However, to establish a foundation upon which Gulf recovery and preservation can be based, those ecological communities which contribute most to ecosystem productivity should be distinguished. Thus, the merits of protecting those areas through mitigation of humankind's impacts upon them begin to become apparent.

What Makes a Particular Habitat Type Crucial?

A variety of governmental standards exists for identifying, designating, and protecting especially important marine habitats. The Commonwealth of Massachusetts, for example, protects crucial regions through its Areas of Critical Environmental Concern (ACEC) program, which is implemented by the Coastal Zone Management Office in the Executive Office of Environmental Affairs. The ACEC program recognizes plainly "that certain land and water resources are of such limited nature or central importance to the welfare, safety, and pleasure of all Massachusetts citizens that the protection and management of these resources transcend purely local concerns."[1] The

[1] Steve Bliven, "Areas of Critical Environmental Concern," Revised by Bradley W. Barr (Boston: Massachusetts Coastal Zone Management Office, September, 1987), p.I-1.

techniques used to identify and designate ACECs are codified in state regulations by the Executive Office of Environmental Affairs (301 CMR 12.00).

To be nominated as an ACEC, a site must contain at least four features from eleven resource categories, including Fishery Habitat, Coastal Features, Estuarine Wetlands, Natural Hazard Areas, Habitat Resources, and Special Use Areas. Once a site is nominated, the Secretary of Environmental Affairs reviews the proposal and decides whether "threat[s] to public health through inappropriate use, quality of the natural characteristics, productivity, uniqueness of area, irreversibility of impact, imminence of threat to the resource, economic benefits, and other supporting factors" warrant designation.[2]

The difference between the ACEC program and the kind of habitat evaluation necessary for determining which Gulf of Maine habitats should be considered crucial is that ACECs are **specific sites** rather than critical **types** of habitat. It might theoretically be possible to establish a framework in the future whereby individual habitat locations in the Gulf of Maine could be designated Areas of Critical Environmental Concern for the entire Gulf. But for the time being, resource managers who are recommending mitigation strategies for the Gulf will find that general **types** of habitats provide the most utilitarian forum for

[2] Ibid., p.IV-3.

protecting against environmental degradation, such that one set of standards for designating crucial habitats might be used throughout the Gulf. Thus, the criteria used for choosing specific sites may apply equally well to choosing crucial habitat types.

Another standard for singling out especially valuable marine habitats (and one that follows a type-of-habitat approach rather than a site-specific one) is established by the Section 404(b)(1) Guidelines for the U.S. Clean Water Act, which provide specifications for the disposal of dredged or fill material in U.S. waters. Under those guidelines, particularly important marine habitats are referred to as "special aquatic sites" and defined as follows:

> [Special aquatic sites] are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.[3]

A third interpretation of the necessary criteria for designating important habitats is found in the federal regulations for the U.S. Endangered Species Act (ESA). Under the ESA,

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[3] 40 CFR 230.3(q-1)

> "Critical habitat" means (1) the specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographic area occupied by a species at the time it is listed upon a determination by the Secretary (of the Interior or Commerce) that such areas are essential for the conservation of the species.[4]

Upon examining the methods employed by the Massachusetts ACEC program, the Section 404(b)(1) Guidelines, and the Endangered Species Act for defining habitats or areas of special concern, one begins to develop a working understanding of some of the relevant considerations necessary for designating crucial Gulf of Maine habitats. Plainly, such habitats would include areas such as particularly productive breeding grounds, food sources, nesting areas, or physical living environments for marine organisms. Emphasis could properly be placed upon those areas which contribute most to supporting the health and welfare of marine life, including such factors as feeding, reproduction, species diversity, shelter from predators, and general improvements to water quality.

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[4] 50 CFR 424.02(d)

Crucial Gulf of Maine Habitats

Among those Special Aquatic Sites specifically mentioned in the 404(b)(1) Guidelines are some of the key habitats found along the coast of the Gulf of Maine:

> * Mud flats are defined as broad flat areas along the sea coast and in coastal rivers to the head of tidal influence. Coastal mud flats are exposed at extremely low tides and inundated at high tides, thus causing bottom sediments to settle and become resuspended. The substrate contains organic material and fine particles, and mud flats are either unvegetated or vegetated only by algal mats.
> * Vegetated shallows are permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation such as eelgrass.
> * Wetlands consist of areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Where they are adjacent to open water, wetlands generally constitute the transition to upland.

To describe these and other crucial Gulf habitats, a common classification system can be useful. Cowardin et al. classify wetland and deepwater oceanic habitats within two distinct Systems: Marine and Estuarine.[5] Each of these Systems can be broken down further into Subsystems encompassing subtidal and intertidal areas, and then into various habitat Classes. The nearshore environments in the Gulf of Maine that form the core of the current habitat mitigation debate fall under Classes

[5] Cowardin, Lewis M., et al., Classification of Wetlands and Deepwater Habitats of the United States, (Washington: U.S. Fish and Wildlife Service, 1979), pp.5-21.

Unconsolidated Bottom, Aquatic Bed, Unconsolidated Shore, Emergent Wetland, and Scrub-Shrub Wetland.

Habitats such as these are important to the Gulf because of their great productivity, extraordinary value for both fish and fauna, and vital filtering and drainage functions. Commonly, they include salt marshes, bogs, shallow submerged aquatic vegetation beds, and mud flats. Rocky intertidal zones and sandy beaches can also be extremely important coastal habitats, although they are generally considered to be somewhat less critical than the other areas mentioned.

These examples of crucial habitats are not all-inclusive, nor do they apply equally throughout the Gulf. Regardless of the standards used, compiling a definitive "across the board" list of Crucial Habitats is complicated because of the inherent difficulty in comparing the worth of habitats -- especially where a given habitat's function varies regionally. Nevertheless, the following three-pronged test can be used as a "rule of thumb" guide in evaluating such habitats:

> 1) Is the area influenced (i.e. flushed) by the ebb and flow of the tide?
> 2) Is there evidence of high productivity (e.g. presence of peat, detrital sediments, high concentrations of organisms at or below the surface)?
> 3) Does the area contain key indicator species (e.g. Spartina grass, eelgrass, mussels, clams)?

If an area in question meets the first standard, scrutiny should be applied to projects resulting in adverse impacts. If the answer to #2 **or** #3 is "yes," then the area should be considered sensitive, and mitigation may be necessary to offset any encroachments.[6] If all three conditions are met, the area must be regarded as crucial habitat, and either projects should be denied or intensive mitigation should be required.

Ultimately, all four examples of habitat value assessment cited above (the ACEC program criteria, special aquatic sites under the 404(b)(1) guidelines, the ESA's definition of "critical habitat," and the three-pronged test) could be combined and used as a guide by local governments and planning boards seeking to protect the Gulf. It is precisely on such a locally-defined level that a list of "Crucial Gulf of Maine Habitats" will be meaningful.

PART II -- AN INTRODUCTION TO MITIGATION

Mitigation, broadly defined, refers to the alleviation and mollification of damages, such that adverse impacts are made less severe than they would be otherwise. In the course of

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[6] Note that in addition to productive coastal areas, particularly rich offshore fishing grounds (such as banks and ledges) would fall into this category.

mitigation, a reduction is made in the scope, breadth, or extensiveness of an intrusive act in order to limit the effects of the intrusion. Additionally, separate measures may be taken to offset damages incurred as a result of the action. When applied to damages brought on by human encroachments on the marine environment, mitigation generally means any measures that might be taken to alleviate threatening reductions in the quantity, function, and/or value of habitat utilized directly by marine organisms. Mitigation is **not** a "license to fill" whereby developers can legitimately destroy valuable habitats so long as they undertake compensatory measures to offset ecological destruction. Instead, it is a means of scaling back incursions on the environment and offsetting any **unavoidable** impacts. The point of mitigation is 1) to limit damages to valuable habitat, and 2) to restore any ecological functions that are unavoidably lost due to human activities.

The Council on Environmental Quality (CEQ) has defined mitigation in its regulations (40 CFR 1508.20) pursuant to NEPA, the National Environmental Policy Act (42 U.S.C. 4321). The definition is applicable to and binding on all U.S. federal agencies:

> "Mitigation" includes:
> (a) Avoiding the impact altogether by not taking an action or certain 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.

Subsequently, debate surrounding the correct protocol for implementing mitigative measures in the U.S. has focused on whether the CEQ definition should be applied sequentially. Thus, mitigation would follow the five steps in the order they are listed by CEQ, with avoidance being the preferred alternative and compensatory mitigation being reserved as a "last resort" for those impacts that cannot be avoided, minimized, rectified, and/or reduced.

The National Oceanic and Atmospheric Administration, in its 1989 draft "No Net Loss of Coastal and Marine Wetlands" policy, proposed an additional step, "Contribution," which presumably would rank as the sixth (and least desirable) option in sequenced mitigation, and would be applied only in "special instances." For certain cases in which adequate compensatory mitigation cannot be achieved due to pollution, geography, or other constraints, financial contributions toward environmental restoration efforts might theoretically be allowable as a form of

off-site out-of-kind mitigation. NOAA's No Net Loss policy has not been adopted, however, so the exact application of this proposed sixth step to sequenced mitigation remains unclear.

Another version of the CEQ's definition of mitigation is found in the 1990 "Memorandum of Agreement Between the U.S. Army Corps of Engineers and the Environmental Protection Agency Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines." That document combines the five steps of the CEQ definition to form three general types: avoidance, minimization, and compensatory mitigation. Under this framework, "avoidance" refers to allowing Section 404 permit issuance only for the least environmentally damaging practicable project alternative, such that unnecessary damages are avoided at the outset of project planning. "Minimization" implies that project modification and permit conditions may be required in order to lessen adverse impacts, and "compensatory mitigation" is reserved for those proposals that contain unavoidable adverse impacts which remain even after minimization measures have been instituted.

To simplify the scheme somewhat further, one might think of mitigation as encompassing three distinct operations: planning, execution, and restitution. These processes are roughly parallel to the three types of mitigation in the Corps-EPA Memorandum of

Agreement referenced above, but they offer a conceptually distinct perspective by presenting mitigation as an integral part of the development process.

In the **planning** phase, projects would be designed to limit the possibility for environmental conflicts. In the Gulf of Maine, effective mitigation during planning would ensure that non-water-dependent projects were not initiated in intertidal areas, which generally are very productive marine habitats. Such areas would even be avoided (when possible) by water-dependent projects due to the areas' extraordinary significance and importance for marine life. At this stage, all proposed projects would also be evaluated from a societal cost/benefit perspective to determine whether unavoidable project impacts are in the public interest (i.e. are outweighed by the social benefits of proposed projects).

During the **execution** of a project, great care would be taken to hold impacts to sensitive areas to a minimum. Thus, a proposed project might be scaled down so as to avoid encroaching on critical habitats, and avoidable deleterious influences on such areas would be eliminated from the proposal. If harmful consequences of a project are absolutely unavoidable by reasonable means employed in the planning and execution stages, special methods of environmental **restitution** could be required.

In such cases, restitution would restore the affected area to a condition comparable to its previous state, or otherwise would introduce an equivalent or greater value of ecological benefit into the ecosystem.

Compensatory Mitigation: The Crux of the Mitigation Issue

Despite the rather broad definitions of mitigation found in most government policies, which include activities designed to avoid and minimize impacts to sensitive areas, the most tangible form of mitigation is compensation. Once projects meet all practicable avoidance and minimization tests, any remaining mitigation takes the form of some type of restitution. In practice, compensatory mitigation has meant either the enhancement of existing degraded areas, or the creation of new human-made areas to provide a functional equivalent for lost habitat values.

When resource managers recommend habitat creation, most prefer on-site, in-kind replacement in order to duplicate lost functional values as closely as possible. When this proves not to be feasible, either on-site out-of-kind replacement (with the goal of keeping the benefits of compensatory mitigation within the same watershed or geographical region as the lost values), or off-site in-kind replacement (with the goal of retaining the same

functional values of the lost habitat, even in a different location) may be considered. The least ecologically desirable alternative, off-site out-of-kind mitigation, is usually considered only after all other alternatives have been exhausted.

Irrespective of whether habitat creation is on- or off-site or whether it is in- or out-of-kind, however, it is typically practiced at a ratio of one acre of replacement habitat to one acre of impacted habitat. Instituting 1:1 habitat replacement as a general rule of thumb reflects not only an intent to replicate impacted areas as closely as possible, but also the increasingly popular rationale that no net loss of valuable habitats -- particularly wetlands -- should be tolerated. One additional advantage to 1:1 compensatory mitigation is that it is relatively straightforward and easy to comprehend: if "x" area of salt marsh is to be filled, then "x" area must be created in order to compensate for it. It is perhaps worth noting, however, that any reliance on a 1:1 ratio assumes that habitat creation efforts will successfully replace lost habitat values. Many wetland scientists and resource managers question whether such success can ever be achieved, however, so one tactic has been to call for ratios greater than 1:1 as a means of assuring no net loss of functional value.

Mitigation's Purview

In recent years, all forms of mitigation that have been legally required in the Gulf of Maine, including steps to avoid, minimize, and compensate for impacts, have been instituted by way of permit review processes pursuant to various federal and state/provincial laws.[7] Generally, mitigation has been called for only in cases of clearly-delineated coastal habitat alteration -- principally the filling of wetlands -- as opposed to more generalized or incremental sources of habitat degradation (e.g. urban runoff and sewage outfalls) which might not afford clear impacts analyses for environmental damages.

While mitigative measures generally are called for only for specific impacts that are directly attributable to a given source -- mainly physical development -- the basic theory could potentially be applied to numerous different spheres of human interactions with the environment. As stated earlier, "mitigation" in the Gulf of Maine means steps that are taken to limit the ill effects of human actions upon the marine environment, either by refraining from activities that affect the Gulf ecosystem adversely, by limiting the scope, duration, or

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[7] Pertinent laws include the U.S. Clean Water Act, the Massachusetts Wetlands Protection Act, New Hampshire Chapter 482-A (Fill and Dredge in Wetlands), the Maine Natural Resources Protection Act and Lands Use Regulation Law, the Canadian Crown Lands Act, and the Nova Scotia Beaches Act.

extent of such activities, or by compensating for unavoidable impacts through steps designed to restore the functional value of impacted habitats to levels equal to or greater than those that existed prior to the impact.

Were it applied to non-point-source chemical contamination, for example, mitigation would primarily entail the use of pollution control techniques such as restrictions on upland chemical use and improvements to sewage treatment facilities (i.e. avoidance and minimization) since effective compensatory mitigation is generally not feasible for damages resulting from chemical contaminants. Other possible options for mitigation of chemical impacts could include the creation of marshes and similar habitats that can serve as buffers or filters for low-level pollutants, since these environments offer obvious benefits to improving overall water quality and productivity. Additionally, industries whose point-source discharges impact coastal areas adversely could participate in regional clean-up efforts in nearby harbors, estuaries, or other degraded areas.

Likewise, detrimental activities such as ocean dumping could be partially offset by having applicants for offshore disposal permits perform some type of mitigation in order to compensate for benthic impacts. Once avoidance and minimization options were exhausted, possible compensatory mitigation options could

include alternative and less direct contributions toward the conservation of the marine environment, such as scientific monitoring and sampling.

Any expansion of mitigation's purview beyond physical habitat conservation will require enabling legislation and detailed policies. In the interim, until the concept of mitigation for environmental impacts gains broader acceptance, it will be useful to continue to focus analytical attention upon the activities for which mitigation standards already exist. Accordingly, the next section introduces the various governmental agencies charged with regulating activities in the Gulf of Maine for which mitigation is commonly recommended -- filling and dredging of sensitive coastal wetland habitats -- along with the policies, guidelines, and criteria they use to determine appropriate levels of mitigation.

SECTION 2:
EXISTING POLICIES & METHODS OF IMPLEMENTATION

PART I -- FEDERAL AGENCIES

The United States Government

In the United States, impacts to the marine environment are governed by several federal statutes, and the authority for implementing those statutes is shared by the U.S. Army Corps of Engineers and three principal resource agencies. The Corps' role in this process is to issue permits which authorize certain activities that affect the aquatic environment. Meanwhile, the resource agencies -- the Environmental Protection Agency (EPA), the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service (USFWS) -- evaluate proposed projects to assess potential impacts to natural resources.

Each of these four federal governmental bodies has its own procedural methodology for handling mitigation of environmental impacts, ranging from formal Mitigation Policies to informal standards for project evaluation and review. The Corps and the resource agencies often use their respective techniques cooperatively to evaluate projects and to recommend measures for minimizing adverse impacts. The range of criteria and strategies they use may thus afford U.S. agencies broadened flexibility as

they work together toward final (and hopefully unified and environmentally sound) project recommendations.

However, due to contradictory mandates, priorities, or standard operating procedures, federal agencies often disagree during the permit review process. These conflicts, including an absence of consistent interagency policies and standards for environmental protection and mitigation, may have produced a federal permit review system that is incapable of fully protecting the nation's marine resources against the deleterious effects of habitat alteration and destruction. If this is the case, the communities bordering the Gulf of Maine may find that local governments will have to assume increasing shares of responsibility for the stewardship of critical marine habitats in the Gulf ecosystem -- including the establishment of policies capable of assuring that any and all adverse impacts upon the Gulf from habitat degradation and/or loss will be mitigated effectively.

U.S. Agencies and Mitigation Standards

The U.S. Army Corps of Engineers issues permits for various activities pursuant to the Rivers and Harbors Act of 1899 (33 U.S.C. 401, et seq.), the Marine Protection, Research, and Sanctuaries Act of 1972 as amended (33 U.S.C. 1413), and Section

404 of the Clean Water Act (33 U.S.C. 1344). Activities requiring permits include construction of dams, dikes, or other structures in navigable waters of the United States; operations that include excavation, dredging, and/or disposal in navigable waters of the U.S. (as well as transportation of dredged material for purposes of disposal at sea); actions that will alter or modify navigable waterways; and the construction of artificial islands and other devices on the outer continental shelf.

In accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c), the ACOE's District Engineers are required to consult with the Regional Directors of the USFWS and the NMFS, as well as the head of the applicable state agency, "with a view to the conservation of wildlife resources by prevention of their direct and indirect loss and damage due to the activity proposed in a permit application." Additionally, the Corps is required to give "full consideration" to the resource agencies' recommendations in ruling on the issuance of individual or general permits.[8]

In administering the permit program, the Corps, in conjunction with the EPA, follows the Section 404(b)(1) Guidelines (40 CFR Part 230) to determine the potential environmental impacts of proposed projects. Subpart E of those

[8] 33 CFR Part 320.4(c)

Guidelines -- "Potential Impacts on Special Aquatic Sites" -- outlines specific habitat types that merit critical examination in permit applications due to their extraordinary ecological value. Although compensatory mitigation of impacts to such sites is not specifically included in the Guidelines, sensitive habitats found in the Gulf of Maine such as wetlands, mud flats, and vegetated shallows are mentioned explicitly, thereby emphasizing the importance of scrutinizing permit applications that propose to disturb these areas. Moreover, Subpart H of the Guidelines is devoted to "Actions to Minimize Adverse Effects" of **all** proposed projects. Thus, primary mitigation (avoidance of impacts) is tacitly encouraged in certain areas through their designation as Special Aquatic Sites that deserve extra protection, and secondary mitigation (minimization) is directly required in the consideration of all permit applications.

Acknowledging that mitigation demands careful and coordinated action, the Corps and the EPA clarified their approach to the issue in a 1990 Memorandum of Agreement (MOA). The MOA accepts the Council on Environmental Quality's five-part definition of mitigation, but simplifies it for "practical" purposes to form three basic types: avoidance, minimization, and

compensatory mitigation.[9] Significantly, the MOA declares that determinations of appropriate and practical levels of mitigation in individual permit decisions may not always meet the goal of restoring and maintaining existing aquatic resources and achieving no net loss of wetlands functions and values. However, the central goal of no **overall** net loss of wetlands is maintained, presumably through requirements of compensatory mitigation in excess of impacts in certain other permit decisions.

The U.S. Fish and Wildlife Service is the only federal agency that has an established policy on mitigation. Its 1981 "Mitigation Policy" adopts the CEQ's definition of mitigation and considers its "specific elements to represent the desirable sequence of steps in the mitigation planning process." Moreover, the Policy states clearly that "it is the policy of the Fish and Wildlife Service to seek to mitigate losses of fish, wildlife, their habitats, and uses thereof from land and water developments."[10]

The USFWS Policy calls for early involvement in development planning as well as early identification of resource areas

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[9] Each of these definitions of mitigation is discussed above in Section 1. See pp.12-14.

[10] Federal Register, Vol.46, No.15, January 23, 1981, p.7657

containing high and low habitat values in order to facilitate the avoidance and minimization of project impacts. To carry out that goal, the Policy focuses on providing guidance related to habitat value losses by establishing four Resource Categories by which to gauge project proposals. The categories designate habitats along a scale ranging from high value areas that are "irreplaceable on a national basis or in the ecoregion section" for which no loss of existing habitat value is the stated mitigation goal (Category 1), to medium to low value areas for which the desired mitigation goal is to minimize losses of habitat value (Category 4).

Mitigation planning under the Policy is designed to be a cooperative effort to develop mitigation recommendations for resources of concern to federal and state agencies. Furthermore, designation of Resource Categories for particular projects follows a fairly elaborate and detailed scheme including early project evaluation, coordination with state and federal resource agencies, development groups, and the public, and the establishment of a "technical rationale" following specific guidelines prior to the final determination of a Category. Once a Category has been determined, a long-term impact assessment is done according to the "Habitat Evaluation Procedures" and a formal mitigation recommendation is issued.

In contrast to the USFWS, the National Marine Fisheries Service does not have a formal policy governing its mitigation recommendations. A Draft NMFS Mitigation Policy was compiled early in 1990, but it has not yet been sanctioned by the agency. Provisions for mitigation were also included in drafts of NOAA's proposed "No Net Loss of Coastal and Marine Wetlands" policy, but that document has not received agency approval either. In the absence of a formal policy statement, NMFS personnel continue to review project proposals on a case-by-case basis by utilizing common "best professional judgment" techniques. The NMFS also considers the CEQ definition of mitigation (which it, like other agencies, is required to heed) and the mitigation evaluation standards utilized by other agencies as it makes its determinations during the project review process.

Both the NMFS and the USFWS face the added limitation of being powerless to require adoption of their recommendations during the permit review process. Representatives of the resource agencies and the Corps meet together on a regular basis for joint processing of permit applications, but the EPA is the

only resource agency with veto power over proposed projects.[11]

One additional U.S. federal policy addresses the question of mitigation: Executive Order 11990. This Presidential mandate, in furtherance of the National Environmental Policy Act, addresses the protection of wetlands "in order to avoid the adverse impacts associated with [their] destruction or modification," both inland and in the coastal zone. The Order requires that federal agencies take action, consistent with their general responsibilities, to minimize impacts to wetlands and to preserve and enhance their natural and beneficial values. The measure mainly governs purely federal actions, insofar as it does not apply to federal permits to private parties for activities on non-federal properties.

The Canadian Government

Canada divides its federal regulatory authority for management of the marine environment between the Department of Fisheries and Oceans (DFO) and Environment Canada (EC). Generally, jurisdiction for all activities on land rests with the

[11] It should be noted that the procedure required under Section 404(c) of the Clean Water Act for the EPA to veto most permit proposals over the Corps' objections is extremely cumbersome, and is therefore invoked rarely. However, the EPA may veto disposal at sea somewhat more easily than it can most other activities due to the provisions of the Ocean Dumping Act.

provincial government where an activity takes place, while activities in the oceans fall under the jurisdiction of the federal government. Federal laws retain supremacy over provincial laws, however, so coastal impacts on the marine environment are regulated *de facto* insofar as they affect marine life.

Canadian environmental legislation is fairly comprehensive in scope, especially concerning ocean resources. The tone and focus of these conservation statutes tends to be geared toward future economic utilization and development, with preservation emerging as a central principle to reaping benefits later on. The foresight and advance planning reflected in these policies may therefore assure Canadians that their natural resources will be adequately protected for future generations.

However, the federal agencies' emphasis on sweeping policies to establish environmental standards may also have emerged at the expense of detailed regulations to address day-to-day assaults on the marine environment. In other words, broad planning for the future may have resulted -- temporarily or otherwise -- in regulatory lapses during a critical period fraught with increasing development and environmental degradation. If so, the onus for imposing mitigative measures for habitat degradation and/or loss may have to rest with the local governments in Nova

Scotia and New Brunswick until federal or provincial law assumes a greater share of the burden.

Canadian Agencies and Mitigation Standards

The Department of Fisheries and Oceans is Canada's lead agency for protecting marine resources. Under the federal Fisheries Act (R.S.C., 1985, c. F-14), "fish" are defined to include all the life stages of fish, shellfish, crustaceans, marine animals, and marine plants. Fish habitat receives an equally broad definition: those parts of the environment "on which fish depend, directly or indirectly, in order to carry out their life processes." Thus, the DFO's policies are afforded fairly comprehensive application over impacts to the marine environment.

The Fisheries Act requires that proponents for any undertaking that may result in the alteration, disruption, or destruction of fish habitat -- including the introduction of a deleterious substance -- must first provide the Minister of Fisheries and Oceans with information as to the estimated scope of the project's impact. Proponents must also indicate which measures, if any, would prevent or mitigate the project's adverse effects. Upon review of a project's plans and consultation with other federal and provincial agencies, the Minister may impose

whatever additions, modifications, or restrictions to the proposal that are necessary to alleviate its impact.[12]

The DFO's Policy for the Management of Fish Habitat extends federal protection of fishery resources somewhat further. Its stated objective is to increase the natural productive capacity of habitats for fishery resources, thereby emphasizing habitat restoration as well as conservation. The Policy covers such far-reaching effects on fish habitat as liquid effluent discharges, mineral exploitation, non-point sources of chemical pollutants such as pesticides, and the introduction of exotic species. In order to achieve a net gain in productive capacity, the Policy employs a no net loss doctrine as its "guiding principle," while at the same time stressing habitat rehabilitation in areas where economic or social benefits can be increased through the fishery resource.[13]

The no net loss principle is applied by the DFO according to a hierarchy of preferences. First, the DFO strives to maintain without disruption the natural productive capacity of fish habitats by avoiding any loss or harmful alteration as a result of proposed projects. This step is achieved by encouraging

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[12] R.S.C., 1985, c. F-14, section 37.

[13] The Department of Fisheries and Oceans Policy for the Management of Fish Habitat (Ottawa, Ontario: DFO, 1986).

proponents to redesign their projects, select alternative sites, or install pollution control equipment. If the habitat's productive capacity cannot reasonably be maintained through these measures, the DFO may accede to compensatory options. Finally, in those rare cases in which it is not technically possible to avoid or compensate for damages to habitat, mitigation in the form of artificial production to supplement the fishery resource may be considered, subject to certain specified conditions.

The Policy recognizes that in-kind compensatory mitigation for chemical alterations is not feasible. Accordingly, it calls for reliable control techniques to be employed to mitigate these problems from the outset. Primary mitigation for such impacts therefore takes the form of careful site selection coupled with the use of best practicable technology to avoid and minimize adverse effects.

Environment Canada is responsible for pollution prevention, reduction, and control as well as wildlife conservation in Canada's oceans. Under the Canadian Environmental Protection Act (35-36-37 Elizabeth II, Chapter 22), EC requires that any release into the environment of a deleterious substance receive emergency action. The discharger of such substances must take measures "to prevent or eliminate any dangerous condition or reduce or

mitigate any danger to the environment..."[14]

Ocean Dumping -- both on the high seas and in intertidal areas -- is also covered by the CEPA. Section 71 of the Act calls for the Minister of the Environment to issue permits for dumping and filling. When proposed dumping will have destructive effects on marine habitat, EC frequently includes mitigation requirements as conditions to these permits. However, these requirements are not governed by a formal policy statement, so the conditions warranting mitigation and the amounts called for are determined based on the specifics of each case.[15]

PART II -- STATE AND PROVINCIAL AGENCIES

Massachusetts

In Massachusetts, the Executive Office of Environmental Affairs' Coastal Zone Management Program (CZM) has regulatory authority over impacts to the coastal environment. During its Federal Consistency Review process for any project applicant, the CZM applies a No Net Loss of Wetlands Policy that lays out a three-tiered sequential approach:

> 1) Explore alternatives which will avoid impacts.

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[14] 35-36-37 Elizabeth II, Chapter 22, section 57.

[15] J. Stoner, pers. comm., July 11, 1990.

2) When impacts are unavoidable, take all feasible steps to minimize them.
3) Once impacts have been avoided and minimized, require mitigation based on both acreage and function.

The definition of mitigation employed by CZM is substantially narrower than that found on the federal level, insofar as avoidance and minimization are not considered to be forms of mitigation. Rather, mitigation implies compensatory measures to be taken only **after** impacts have been avoided and minimized.

The chief statutory provision for limiting damages to the marine environment in Massachusetts is the Wetlands Protection Act (MGL CH.131, S.40), which is administered by local Conservation Commissions with oversight by the Department of Environmental Protection (DEP), Division of Wetlands and Waterways Regulation. Under the Act, any activity which will remove, fill, dredge, or alter any bank, coastal wetland, flat, marsh, barrier beach, dune, or swamp requires filing a Notice of Intent to initiate public review. Additionally, activities proposed within a 100-foot buffer zone of the specified areas which may affect them also require a Notice of Intent. In the end, the local government either imposes any conditions necessary to protect the resource, or makes a determination that no such conditions are required.

The regulations to the Wetlands Protection Act (310 CMR 10.00) apply to those sites that are determined to be significant to the protection of shellfish, marine fisheries, or wildlife habitat, or to the prevention of pollution or storm damage. Presumably, this means that significantly degraded habitats are not necessarily covered by the Act. Additionally, the Commissioner of the DEP may issue a variance to waive certain requirements of the Act for habitats that **are** significant upon finding that:

> 1) there are no reasonable conditions or alternatives that would allow the project to proceed in compliance with the regulation(s);
> 2) that mitigating measures are proposed that will allow the project to be conditioned so as to contribute to the protection of the interests identified in the Act; and
> 3) that the variance is necessary to accommodate an overriding community, regional, state, or national public interest; or that it is necessary to avoid an Order that so restricts the use of property as to constitute an unconstitutional taking without compensation.[16]

Proposals for mitigation are evaluated on a case-by-case basis, and for salt marshes, at least a 2:1 replacement ratio is typically required.[17] Moreover, regardless of the stringency of compensation requirements, the regulations state that variances

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[16] 310 CMR 10.36

[17] F. Courtney, pers. comm., June 27, 1990.

are to be issued "only in rare and unusual cases."

The Wetlands Conservancy Program (formerly the Wetlands Restriction Program, MGL CH.130, S.105; 302 CMR 4.00) takes a slightly different approach to protecting sensitive marine habitats than the Wetlands Protection Act. The Program addresses wetland conservation proactively by identifying and mapping important areas before alteration projects are proposed. As a result, potential applicants for permits under the WPA are discouraged from applying to alter demarcated resource areas, thus avoiding from the outset many proposals for environmentally damaging projects. The program allows the Commissioner of Environmental Management, with approval from the Board of Environmental Management, to adopt, amend, modify, or repeal orders regarding the alteration of coastal wetlands. The result is a state-level review of wetland locations to provide standards for permitting by local Conservation Commissions.[18]

New Hampshire

New Hampshire Chapter 482-A, Fill and Dredge in Wetlands, replaces the former RSA 483-A, which bore the same title. The law protects submerged lands and wetlands from despoliation by requiring permits for proposals to construct, excavate, remove,

[18] M. Vershbow, pers. comm., July 27, 1990.

fill, or dredge in those areas. The New Hampshire Wetlands Board, which is comprised of representatives from a number of state agencies, municipalities, soil and water conservation districts, and local Conservation Commissions, is authorized to promulgate rules and issue permits for these activities.

The Wetlands Board conducts hearings and issues permits for endeavors such as excavation, dredging, and filling waters of the state, and construction on or removal of any bank, flat, marsh, or swamp. The Board may deny petitions or require modifications to proposals, and if it determines that a wetland is at immediate risk from a regulated activity, the Board may issue an order of cessation and require remedial measures.

Under Chapter 482-A, any local conservation commission, planning board, or legislative body in New Hampshire may designate "prime wetlands" lying within its municipal boundaries. Prime wetlands are deemed to have substantial significance due to their size, unspoiled character, fragile condition, or other relevant factors. Because of their exceptional value, prime wetlands are given special consideration by the Board as it reviews permit applications.

The New Hampshire Code of Administrative Rules for the Wetlands Board (Chapters Wt 100 through Wt 800) require that permit applications be evaluated according to various habitat

value considerations, and that approval be subject to certain conditions. The Rules contain no specific mitigation policy, but they do attempt to avoid and minimize impacts to sensitive areas, and approval conditions can include siting constraints and buffer zones to protect important resource areas. General practice is for the Wetlands Board to review projects on a case-by-case basis and to recommend mitigation for unavoidable impacts. The Board particularly encourages habitat restoration efforts as mitigation, such as re-opening circulation to tidal areas that have been cut off by prior encroachments.[19]

Maine

In Maine, the Natural Resources Protection Act (38 MRSA 480 A-S) consolidates several previous laws pertaining to coastal wetlands, sand dunes, and other protected natural resource areas.[20] The NRPA prohibits most alteration activities from occurring in, on, or adjacent to a protected area without a permit from the Department of Environmental Protection (DEP).

Generally, a permit is required for construction, fill, dredge, and draining/dewatering projects taking place within 100

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[19] K. Kettenring, pers. comm., July 20, 1990.

[20] Protected coastal areas include aquatic vegetation beds, swamps, marshes, bogs, beaches, flats, and all tidal and subtidal lands.

feet of a protected resource area. Proposed activities must not:

- o unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses;
- o cause unreasonable erosion of soil or sediment, or prevent naturally-occurring erosion;
- o unreasonably harm any wildlife or aquatic habitat;
- o unreasonably interfere with the natural flow of any surface or subsurface waters;
- o lower water quality;
- o cause or increase flooding;
- o on sand dunes, unreasonably interfere with sand supply or movement, or increase erosion; or
- o cross a river segment identified in the law as "outstanding," unless no other alternative having less adverse impact on the river exists.[21]

Several minor activities that do not significantly affect the environment are permitted by rule, but proponents of such projects must still file a notification form with the DEP.

Under the DEP's Wetland Protection Rules (Chapter 310) for implementing the NRPA, coastal habitats are classified according to the following scheme:

Class I includes all tidal and subtidal lands, areas containing endangered or threatened plant species, habitat for endangered or threatened animal species, critical spawning and nursery areas for Atlantic sea run salmon, and certain other high and moderate value wildlife habitats.
Class II wetlands do not contain any of the characteristics of those in Class I, but are either located within 250 feet of a coastal wetland, contain at least 20,000 square feet of aquatic or marsh vegetation or open water during most of the growing season in most years, or are floodplain wetlands.
Class III wetlands have none of the characteristics of either Class I or Class II wetlands.

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[21] "DEP Issue Profile: Natural Resources Protection Act" (Maine Department of Environmental Protection, January, 1989).

Classification thus provides a framework for habitat conservation by creating a hierarchy to which mitigation can then be applied.

The Wetland Protection Rules adopt a modified version of the CEQ definition of mitigation as a guide for offsetting potential adverse environmental impacts. The rules also establish explicit standards for avoidance, minimization, and compensation, including preferences for how to compensate for alterations to wetlands and the amounts of compensation that will be required. Restoration of degraded wetlands is viewed as the most desirable form of compensatory mitigation, followed by enhancement of existing wetlands, preservation of existing wetlands or adjacent uplands, and lastly, wetland creation from an upland. Mitigation at a minimum of a 1:1 ratio is required for restoration, enhancement, or creation in Class II or Class III wetlands. A 2:1 minimum is required for restoration, enhancement, or creation in Class I wetlands, and 8:1 mitigation is required for preservation in all wetland classes. In spite of these requirements, the DEP may deny projects that have "unreasonable impacts" on the environment based upon the standards of the NRPA.

Finally, the Wetland Protection Rules state that mitigation banking may be considered as a means of alleviating impacts associated with one or more alteration projects proposed in the future. Mitigation banks are subject to scale restrictions and

additional requirements such as sufficient expertise, experience, and resources to undertake and maintain them. The mitigation banking option was originally included in the DEP's wetland rules to facilitate mitigation planning for the Maine Department of Transportation, but any public or private entity may apply to the DEP to establish a mitigation bank.[22]

New Brunswick

The New Brunswick Department of Natural Resources and Energy (DNR&E) is currently planning for and designing a Wetlands Protection Act which would address the implications of coastal habitat alteration to fisheries and other uses. As proposed, the Act would include a three-tiered wetland classification system as well as some type of wetlands designation program, and it may constitute a bilateral effort between the DNR&E and the Canadian Wildlife Service, which is responsible for seabird research. Presently, the Act remains in its very preliminary stages.[23]

In the interim, DNR&E regulates activities in the coastal zone on a case-by-case basis, and rejects proposals for projects that would lead to significant adverse impacts on federally-protected marine fisheries or the coastal environment. If a

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[22] D. Witherill, pers. comm., July 24, 1990.

[23] P. Kehoe, pers. comm., June 29, 1990.

project proponent appeals a rejection, DNR&E staff typically meet with the applicant to negotiate potential modifications that might make the project acceptable, including mitigation. When mitigation is recommended, best professional judgment dictates its scope.[24]

Nova Scotia

The Department of Lands and Forests (DLF) is Nova Scotia's chief agency for coastal habitat management. The DLF is charged with implementing the Nova Scotia Beaches Act, which requires a permit for any activity occurring on submerged lands (those seaward of the high water line). Since the DLF does not have a policy for coastal "infilling," permit applications are typically reviewed on a case-by-case basis. Moreover, the concept of mitigation for habitat losses is reportedly rather new to DLF staff, so they have no established guidelines for its use. When coastal impacts appear to have direct implications for marine life, DLF defers to the federal Department of Fisheries and Oceans to impose mitigation requirements or other project conditions.[25]

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[24] Ibid.

[25] R. Redden, pers. comm., July 31, 1990.

SECTION 3:
ANALYSIS OF EXISTING POLICIES FOR MITIGATION

The laws, regulations, and policies that are currently in place to address mitigation in the Gulf of Maine vary tremendously. Regulatory authority is heavily centralized in some regions, and broadly decentralized in others. Methodologies for designating sensitive habitats and mitigating encroachments on them range from comprehensive standards with specific requirements to nebulous guidelines that are highly discretionary. In some cases, specific policies for habitat mitigation are simply nonexistent.

This section is not intended to serve as a critique of each state or province's individual laws and policies, nor is it intended to evaluate different regulatory organizational structures to determine which is the most effective at protecting natural resources. Instead, it focuses on the overall effectiveness of current governmental habitat management strategies around the Gulf, with an emphasis on mitigation of damages to the marine environment. Federal efforts are discussed in Part I, followed by state and provincial in Part II. Table 1, on the last page of this section, summarizes current mitigation efforts around the Gulf.

PART I -- ANALYSIS OF FEDERAL MITIGATION EFFORTS

Federal government involvement in regional or local environmental management decisions is a constitutionally contentious issue in both the United States and Canada. The two countries divide jurisdiction for managing their natural resources somewhat differently, but both national governments retain substantial involvement in implementing marine resource management policies affecting their respective national waters.

In the U.S., federal participation in marine habitat protection policy is high despite the potential for broad involvement by state and local governments. As mentioned above in Section 2, each of the four pertinent federal agencies which oversee the permit process has its own system for reviewing proposed projects for environmental concerns. In light of their different mandates, it is not surprising that each agency approaches mitigation somewhat differently. Yet one might reasonably expect these agencies to share the common goal (enunciated clearly by the present Administration) of no net loss of wetlands and other crucial habitats **and** to work towards that goal cooperatively.

Whether or not these expectations have proven to be correct is subject to interpretation. According to a 1988 General

Accounting Office study on the administration of the Section 404 permitting program, "the Corps and the resource agencies disagree concerning whether the Corps is doing all it can to protect wetlands under existing program authority. Although the Corps districts generally consider resource agencies' comments on permit applications, they often do not adopt recommendations that would lead to project modifications or denial."[26] Since that report was released, the Corps and the EPA have signed a Memorandum of Agreement assuring improved cooperation in mitigation efforts under the 404(b)(1) Guidelines. Nevertheless, recent conversations with resource agency staff in New England indicate continued frustration with the limited implementation of their recommendations.[27]

Further, U.S. federal agencies have no consistent interagency standards to guide their compensatory mitigation recommendations. The Corps of Engineers cautions permit applicants to be prepared to replace lost acreage of sensitive habitats, yet evidence as to whether human-made habitats ever reach the same levels of productivity as natural ones remains

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[26] United States General Accounting Office, "Wetlands: The Corps of Engineers' Administration of the Section 404 Program" (Washington: GAO, July, 1988), p.3.

[27] E. Reiner (EPA), pers. comm., July 3, 1990; C. Mantzaris (NMFS), pers. comm., June 19, 1990.

inconclusive. Consequently, resource agencies' comments often include recommendations for mitigation far in excess of a 1:1 ratio, but mitigation ratios greater than 1:1 are seldom required as permit conditions.[28]

The resource agencies sometimes disagree amongst themselves, too. For instance, the USFWS often favors projects that would alter natural habitats provided they also enhance wildlife values. Meanwhile, the NMFS tends to advocate leaving habitats in their natural state wherever possible. Which of these resource management philosophies is "best" for the environment is unclear, but such differences in professional opinion can obviously lead to very dissimilar mitigation strategies.

In short, U.S. federal mitigation efforts are severely hampered by inconsistency and lack of information. Agencies are required to follow the CEQ's definition for mitigation, yet only the USFWS has formally adopted its sequential application, and the NMFS has no policy statement for its use. Moreover, permit review procedures are not easily comprehensible to the general public --due in large part to the agencies' failure to specify what types and amounts of mitigation are generally considered

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[28] Ratios greater than 1:1 are recommended to replace lost wetland functions as well as acreage, to compensate for the limited historical success of habitat creation efforts, and to alleviate the loss of valuable habitat while mitigation sites are becoming productive.

acceptable. Permit applicants are thus left with no clear set of standards to apply in designing their proposed projects, and resource managers have no quantifiable means of gauging applicants' proposals. Additionally, the focus of U.S. mitigation efforts is on physical impacts rather than chemical, despite indications that chemical impacts may have a far greater effect on loss of crucial marine habitat functions and values.

Canadian mitigation strategies take a broader approach by addressing both physical and chemical impacts from point- and non-point sources. However, despite their breadth, Canadian policies provide little federal oversight of cumulative habitat losses caused by small projects. Instead, the DFO's fish habitat policy relies heavily upon the provinces to aid in identifying fish habitat protection requirements. The problem is that no comprehensive policy exists for coastal "infilling" or for regulating other less-obvious deleterious forces (e.g. non-point source pollution), thus limiting New Brunswick and Nova Scotia's ability to bear the regulatory burden, to manage habitats effectively, or to mitigate losses successfully.

A related problem is that jurisdictional lines are often unclear. Federal agencies (DFO and Environment Canada) are responsible for regulating activities in the oceans, while the provinces retain jurisdiction over all activities on Crown Lands.

However, the seaward extent of territorial jurisdiction is not clearly defined for New Brunswick and Nova Scotia. Thus, coastal zone development -- which accounts for most physical habitat destruction -- is subject to regulatory neglect due to domain-related vagaries. While it might seem appropriate to divide authority along functional lines according to "land" and "water," the distinction is far from clear in the coastal zone.

PART II -- ANALYSIS OF STATE/PROVINCIAL MITIGATION EFFORTS

It is important to note at the outset that a direct comparison between the participation of the two Canadian provinces and the three U.S. states in mitigation efforts can be misleading. New Brunswick and Nova Scotia are not states, and hence they do not perform exactly the same regulatory functions that states typically do. The reverse is also true: Massachusetts, New Hampshire, and Maine play different governmental roles than provinces. But in spite of these differences, both states and provinces can play a vital role in encouraging sound habitat management.

Current state and provincial involvement in Gulf of Maine habitat mitigation can be grouped into two general categories: the policies in place, and the procedures used to carry them out.

In many cases, procedural flexibility is constrained by policy since government agencies can only do what the law allows them to do. Nevertheless, agency implementation of laws and policies can be at least as great an influence on regulatory effectiveness as the enactment of laws themselves.

Current Policies

Of the five state/provincial regions, all except New Brunswick require some type of permit for dredge and fill activities in tidal areas, but only Massachusetts and Maine have formal policies in place to combat habitat loss. Moreover, the focus of habitat conservation efforts throughout the Gulf is on physical impacts rather than the combination of physical and chemical effects. The result is that existing policies -- what few there are -- fail to address some of the most pressing threats to crucial Gulf habitats.

Similarly, existing policies in the states and provinces (including standard operating procedures in the absence of actual policies) center compensatory mitigation recommendations on acreage guidelines, with little statutory regard for functional habitat replacement values. Does human-made habitat eventually replicate the functions of natural habitat? If so, how long does it take? Should replacement acreage exceed the acreage of

habitat impacted in order to compensate for lags in net habitat value? The status of habitat creation science is such that few definitive answers exist, but current state and provincial policies (like their federal counterparts) do not seem to account for such uncertainties.

Policy Implementation

Analysis of the implementation of habitat mitigation policies in the Gulf reveals several key deficiencies. The first and most obvious problem is that not all areas have explicit standards for habitat conservation and mitigation. Thus, with no policies to guide their recommendations, provincial and state resource managers must evaluate projects on a case-by-case basis. The absence of mitigation policies means that reviewers can examine proposals unhindered by rigid standards (i.e. avoiding "cookie cutter" style evaluations), but it also leaves the review process without clear, unified criteria for applying ecosystem-based management practices.

This policy void is magnified by the tendency for individual states and provinces to operate in vacuums. Quite simply, officials in one political region often do not know how their counterparts across the border are handling similar situations. For example, existing mitigation policies in Maine are very

different from those in New Hampshire and New Brunswick, yet resource managers in those regions tend not to know how Maine's habitat protection efforts operate. The same is generally true for all three states and two provinces: there is scant evidence of inter-jurisdictional coordination or cooperation regarding habitat management efforts.

Procedurally, the provinces and states implement habitat management through different governmental entities. In Massachusetts, local Conservation Commissions are responsible for project reviews; in New Hampshire the state Wetlands Board, including both local and state officials, evaluates proposed activities; and in Maine and the two provinces, state/provincial-level departments handle all such proposals. It is unclear how heavily the level of implementation (i.e. state agency vs. local commission vs. some combination of the two) bears upon the effectiveness of habitat mitigation efforts. But regardless, the degree to which management authority is centralized within each province/state is certainly an important factor when it comes to developing a comprehensive management scheme.

PART III -- CONCLUDING OBSERVATIONS

MITIGATION EFFORTS AROUND THE GULF OF MAINE

	Definition of Mitigation	Permit Required for Dredge/fill etc.	Policies for Mitigation	Entity Responsible for Implementation	Standards for Implementation	Pertinent Laws
MA	compensatory (implicit)	by DEP, in consultation with local cons. comm.	CZM No Net Loss Policy	local Conservation Commissions (with DEP)	1) avoid 2) minimize 3) mitigate	Wetlands Protection Act; Wetlands Restriction Program
NH	***	by NH Wetlands Board	***	NH Wetlands Board	case-by-case	482-A (Fill & Dredge in Wetlands)
ME	1) avoid 2) minimize 3) rectify 4) reduce 5) compensate	by Department of Environmental Protection	Wetland Protection Rules	Department of Environmental Protection	for restoration, creation, or enhancement, 1:1 in Class 2 or 3 areas; 2:1 in Class 1; 8:1 for preservation in all areas	Natural Resources Protection Act
NB	***	***	***	Department of Natural Resources & Energy	case-by-case	***
NS	***	by Department of Lands & Forests	***	Department of Lands & Forests	case-by-case	NS Beaches Act
US	avoid, minimize, rectify, reduce, compensate	by Corps of Engineers, in consultation with EPA, NMFS, USFWS	404(b)(1) Guidelines; EPA/COE MOA; USFWS Mitigation Policy	Corps of Engineers	case-by-case following CEQ steps; acreage usually replaced at 1:1 ratio	Clean Water Act; Rivers & Harbors Act; Fish & Wildlife Coordination Act
CAN	***	by Dept. of Fisheries & Oceans, in consultation with provinces	DFO Fish Habitat Policy	Department of Fisheries & Oceans	1) avoidance 2) minimization 3) compensation 4) stock enhancement	Fisheries Act; Canadian Environmental Protection Act

(*** = None)

Without active monitoring of individual projects, the efficacy of governmental mitigation efforts is difficult to gauge. But in spite of this fact, evidence indicates that compliance monitoring and detection of unauthorized activities is lacking. The U.S. General Accounting Office's 1988 study found that the Corps of Engineers does not emphasize monitoring and enforcement activities, that not all permits are inspected for compliance, and that the EPA has little involvement in enforcing Section 404 of the Clean Water Act.[29] Numerous conversations with resource managers around the Gulf yielded the same conclusion: despite the poor-to-moderate success rate of most habitat creation efforts and the uncertainties associated with habitat restoration and enhancement, monitoring and enforcement of compliance is deficient at best.

In summary, existing state/provincial habitat mitigation strategies are constrained by the following:

- policies that focus on the acreage impacted or replaced, rather than addressing functional values of lost habitat;
- policies that fail to address chemical impacts to marine habitat;
- an absence of habitat mitigation policies in some areas;
- the tendency of many state/provincial resource agencies to operate in a state of isolation from other agencies; and
- differing levels of bureaucratic implementation, ranging

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[29] Supra note 26, pp.55-75. Kyla Bennett of EPA Region I's Wetland Protection Section admits that EPA does minimal permit compliance enforcement, but points out that the agency often takes action against those who have failed to secure a permit at all. (K. Bennett, pers. comm., October 10, 1990.)

from highly centralized to broadly decentralized. These deficiencies are compounded by federal mitigation efforts' inconsistencies in mandates, policies, and comprehensiveness. Further, monitoring of habitat mitigation efforts and enforcement of existing policies is inadequate throughout the Gulf region.

SECTION 4:

RECOMMENDATIONS FOR MITIGATION IN THE GULF OF MAINE

The principle of habitat mitigation is central to sound natural resource management. Short of a complete proscription on further coastal development, habitat mitigation offers the only reasonable method by which to offset impacts to the Gulf and its resources. It also has the advantages of being a relatively easy concept to understand (i.e. if you take something from the environment, you must give something back) and one that offers the possibility of very tangible benefits (physical improvements to marine habitat).

For the Gulf of Maine Initiative, coordinated ecosystem management will depend heavily upon consistent policies, improved communication between political jurisdictions, and a clear commitment by local communities toward sustaining the Gulf. Successful mitigation efforts require these traits as well, and they are embodied in the following recommendations:

1) The burden for instituting habitat mitigation requirements should rest with the states and provinces. Due to their familiarity with regional needs, state- and provincial-

level policymakers are the best suited for regulating localized activities. Authority could be further decentralized by transferring all regulatory power to the local communities, but taking such a microcosmic approach eludes the more comprehensive view needed for managing a complex, dynamic environment. Similarly, centralized federal-level management risks failing to account for regional ecological differences -- and instead applying a "rubber stamp" approach to mitigation. Alternatively, a successful strategy would combine the best elements of federal, state, and local government participation.

Under such a system, local Conservation Commissions, planning boards, and similar bodies would be primarily responsible for reviewing applications for permits to undertake activities affecting marine habitat. The states and provinces would provide guidelines for mitigation, but localities would implement them on a case-by-case basis. State/provincial departments would then issue the permits, based upon the localities' recommendations,[30] and typically including stringent mitigation requirements. Careful oversight by provincial/state agencies would ensure that Conservation Commissions adhered to

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[30] Massachusetts' system is currently structured in a similar fashion, although its Department of Environmental Protection has also delegated most permitting authority to the Conservation Commissions. Refer to Section 2 (page 30) for a complete discussion.

regional standards for habitat management, thus assuring equal application of the law. Federal governments would continue to regulate impacts to the marine environment as well, but ideally, local review and state/provincial permitting would ensure that best management practices were instituted prior to federal involvement.

2) Each state and province should adopt an explicit definition of mitigation as a guide for resource managers and developers alike. Little explanation is necessary for this recommendation. Without a clear definition, mitigation is subject to very broad interpretation. This clarified version of currently accepted definitions would serve the purpose well: **Primary mitigation** entails techniques to avoid and eliminate all adverse impacts to the marine environment, and would be applied during the planning phase of individual projects; **secondary mitigation** would require minimizing and reducing any unavoidable impacts during the execution of each project; and **tertiary mitigation** would include compensatory measures -- subject to strict guidelines -- designed to offset any and all remaining impacts.

3) Each state and province should adopt formal standards for habitat value assessment and mitigation. As discussed in Section 1, the intrinsic and relative values of particular habitats vary regionally. Therefore, mitigation requirements that consider acreage alone are plainly insufficient. A better technique would be to develop a simple system of habitat value assessment analogous to the U.S. Fish and Wildlife Service's "Resource Categories." With such a system, habitats could be rated according to their value to the watershed and to the ecosystem as a whole (perhaps even as simply as "excellent/good/moderate-to-poor" or "rare/common/abundant"). Thus, local officials would have a practical tool by which to gauge the functional value of areas to be impacted.

Once habitat value assessment was complete, mitigation requirements would be imposed according to a sequential approach not unlike those currently practiced. For compensatory mitigation, specific ratios of replacement acreage to acreage lost would depend upon the value of the habitat impacted. As minimum standards, the states and provinces should require 2:1 mitigation for habitat creation, and 3:1 for restoration and enhancement. Resource managers should consider imposing higher ratios for impacts to more valuable habitats, or whenever the

success of mitigation is questionable.[31]

4) Federal and provincial/state resource agencies should consider expanding their habitat conservation and mitigation policies to include chemical impacts to the marine environment. Physical threats to marine habitat are of profound importance, but pollution by chemical contamination may pose an even greater danger to the health of the Gulf. In addition to the common pollution control techniques of avoidance and minimization, efforts to improve water quality should encompass compensatory measures requiring point-source polluters to offset any unavoidable adverse impacts to the marine environment.

Likewise, the states and provinces should consider instituting laws to limit pesticide and fertilizer use in residential areas where runoff could contribute to non-point-source pollution. At the same time, local communities should ensure that their zoning requirements leave adequate buffer zones in coastal areas to help filter out non-point-source contaminants before they reach the Gulf.

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[31] These recommended ratios are admittedly somewhat arbitrary. However, in the absence of conclusive scientific evidence suggesting more appropriate levels of mitigation, these figures can serve as guides toward assuring that lost habitat values are compensated sufficiently.

5) The jurisdictions surrounding the Gulf should work cooperatively to ensure consistency in their resource management objectives, if not in actual policies. Although laws and policies need not be exactly the same everywhere, they must be oriented toward similar goals if they are to serve similar purposes. Accordingly, a joint effort amongst the states and provinces to manage the Gulf of Maine requires consistent efforts focused on the long-term productivity of the ecosystem. This process should include initiating an education program to acquaint resource managers around the Gulf with the tactics employed by their peers in neighboring jurisdictions. Thus, while the three states and two provinces are coordinating their policies to meet the Gulf's long-term needs, the various resource agency staffs can broaden their perspectives on unified Gulf management.

6) Provincial, state, and federal agencies should increase their efforts to monitor habitat mitigation projects and to enforce habitat conservation laws. No matter how stringent mitigation requirements are, they are ineffectual without compliance. Therefore, habitat enhancement, restoration, and creation projects must be monitored until they become ecologically stable -- which could span several growing seasons.

Those that fail to replicate or improve upon lost habitat values must themselves be mitigated. Likewise, efforts must be increased to detect illegal, unpermitted activities that impact the Gulf adversely, and violations should be dealt with expeditiously. Good enforcement is vital to the success of habitat management policies.

7) Federal and state/provincial resource agencies should develop public affairs programs to teach residents of Gulf communities about sound resource management practices. This last recommendation is commonsensical. Although resource agencies might not consider citizen outreach campaigns to be a priority mission, improved communication between the regulators and the regulated can only help to assure improved compliance with habitat conservation policies. Besides, who could be better qualified to educate the public about sound ecological management than the guardians of public trust resources?

As an important part of the public awareness/education campaign, each province and state should develop a basic guidebook to the permitting process that could be distributed to potential permit applicants. Such a publication would generate cost savings for all parties by providing simple, straightforward answers to common questions about legal requirements for projects

impacting the marine environment. What activities require a permit? What mitigative measures are needed to secure project approval? What standards do resource agencies apply during the permit review process? Improving the public's understanding of government requirements, **as well as the rationale for those requirements,** will yield substantial returns by encouraging compliance from the outset.

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Fish and Wildlife Coordination Act (16 U.S.C. 661, et seq.) and related Corps of Engineers regulations (33 CFR 320)

Endangered Species Act (regulations, 50 CFR 424)

National Environmental Policy Act (42 U.S.C. 4321; 40 CFR 1508)

Memorandum of Agreement Between the U.S. Army Corps of Engineers and the Environmental Protection Agency Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines

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National Marine Fisheries Service Habitat Conservation Policy (Federal Register, Vol.48, No.228, pp.53142-53147)

Draft NMFS Mitigation Policy

Draft NOAA No Net Loss of Coastal and Marine Wetlands Policy

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Canada

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Department of Fisheries and Oceans Policy for the Management of Fish Habitat

Canadian Environmental Protection Act (35-36-37 Elizabeth II, Chapter 22)

Massachusetts

CZM No Net Loss of Wetlands Policy

Wetlands Protection Act (MGL CH.131, S.40) and regulations (310 CMR 10.00)

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New Hampshire

Chapter 482-A, Fill and Dredge in Wetlands

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Maine

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