A Survey and Synthesis of Significant U.S. Law and Priorities Influencing Governance in the Gulf of Maine Region

A Summary Report Submitted to the Gulf of Maine Council on the Marine Environment

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Table of Contents

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1.0 Introduction

The Gulf of Maine is well known as one of the most biologically productive marine regions on earth. Its prominent underwater banks, the most prominent being Georges Bank, formed 15,000 years ago during the recession of the last ice age, are thought to serve as nutrient trapping barriers. Its pear-like shape, narrow in the north and wider in the south, drives fast tidal currents (Gulf of Maine Council 2001; (Richert and Incze 2003). The tides combine with upwelling currents, strong lunar tides, stable water temperatures and storm activity to create ocean circulation patterns that constantly mix deep-water nutrients into the photosynthetic zone, resulting in high primary productivity (Jennings, et al. 2001).

The high tides and cold, nutrient rich waters of the Gulf of Maine support several thriving ecosystems which are both complex and diverse (Smith 1997). The near-shore ecosystem is characterized by estuarine regions, greater temperature extremes, and lower salinity. The near shore coastal system also includes the shallow (< 50 m) coastal waters and well mixed embayments found in the U.S. and Canada (Smith 1997). With coastal factors that include five significant river systems supplying an estimated 100 million gallons of fresh water and nutrients into the Gulf daily, increasing coastal development, population growth, and point and non-point pollution, the regulatory schemes for land-based human activities that impact the Gulf merit close scrutiny.

The greater portion of the Gulf of Maine is comprised of the waters offshore and on the banks that form the barrier between the Gulf of Maine and the open Northwest Atlantic. In these areas human impacts are confined mainly to the over harvesting of commercially valuable fish species. In these regions nutrient-rich slope water from deep in the North Atlantic, intermediate water along with offshore water intrusions deliver new nitrogen and other nutrients to the surface through vertical mixing, winter convection and other methods (Townsend 1996). In simple terms, the numerous physical processes operating in a variety of ways, both inshore and offshore, contribute enormous amounts of primary producers fueling the bottom of the food chain in both regions. It is this abundant primary production that contributes to the growth and development of the food chain's tertiary consumers (Gulf of Maine Council 2000).

The Gulf of Maine, including the Bay of Fundy, provides valuable services and resources to the region. Some of these services are visible, others are not so apparent. Commercial and recreational fishing industries in the Gulf of Maine employ many thousands and provide the social and economic lifeblood for a significant number of towns and villages along the Gulf coast of Canada and the United States. The Gulf also provides an outlet for tourism and recreation, shellfish harvesting, marine transportation, cultural identity, coastal economic development and other important and tangible products. The land around the Gulf is sought after for valuable agriculture as well as for residential,

commercial and industrial value, with pressure heaviest in southern regions. There is abundant evidence that human populations will continue migration to the coast for a host of reasons, not the least of which is the intrinsic appeal of many coastal landscapes and habitats (NHEP 2000; M.S.P.O. 2001).

With respect to living marine resources, decades, some say centuries, of resource extraction and exploitation by humans have taken a toll on Gulf of Maine (Pauly, Christensen et al. 1998; Jackson, Kirby et al. 2001; Steneck 2001). While there has been recent marginal improvement with rebuilding some stocks[1], landings of key commercial species generally continue to suffer and continued overcapacity perpetuates the paradigm of too many fishers chasing too few fish (Hanna, Blough et al. 2000). Diversity in the Gulf's marine ecosystem has been markedly reduced over millennia and historic food webs have been transformed into food chains due to the serial targeting and depletion of finfish and other top consumers. Some scientists have asserted that the cascading consequences of overfishing have resulted in a phase shift that has replaced cod with crab as the apex predator in the Gulf of Maine (Steneck, Vavrinec et al. 2004). Others warn that without the restoration of ecosystem food webs and improved water quality, marine ecosystems will lose resilience and become increasingly vulnerable to global climate change and other unforeseen future threats (Pandolfi, Jackson et al. 2005). Despite the continued threat of overfishing, stock rebuilding timetables and restoration efforts are under siege from both Congress and the judiciary (Safina, Rosenberg et al. 2005).

Stresses impacting the Gulf of Maine extend beyond the pressure put on it by the fishing industry (Pauly and Maclean 2003). Toxic contaminants found in the waters of the Gulf region, for instance, are widely distributed (Chase, Jones et al. 2001) and have been linked to endocrine system harm in humans and wildlife (De Guise, Shaw et al. 2001). Commercial fish that are harvested from the Gulf are increasingly subject to Fish Consumption Health Advisories because of their high burdens of mercury, PCBs, dioxins, and other toxins (Hildebrand, Pebbles et al. 2002). On the heels of the largest "red tide" in recorded history it should be no surprise that the incidence of toxic algal blooms have increased (Signel 2001). Beach and shellfish area closures are common (Field, Boesch et al. 2001; Hildebrand, Pebbles et al. 2002). The rapid introduction of invasive species in the Gulf of Maine has "profoundly changed the structure and functioning of …coastal marine communities" (Steneck and Carlton. 2001). Shoreline development, deposition from polluted air, continued end-of-pipe discharges and non-point source pollution pose additional stress to the integrity of the Gulf's natural systems (USGS 2001; Hildebrand, Pebbles et al. 2002; Pandolfi, Jackson et al. 2005).

Nearly all of the human activities that pose threats to the Gulf ecosystem, including pollution, coastal development, and overfishing, are still managed, some more intensely than others, on a traditional sector-by-sector basis. Current laws reflect the traditional

[1]Data and conclusions from the recent Groundfish Assessment Review Committee ("GARM"), a regional review peer-review process designed to provide stock assessment updates for the 19 stocks managed under the Northeast Multispecies Fishery Management Plan ("Multispecies FMP") demonstrate the mixed results of multispecies management efforts since 2001. Of the 19 stocks assessed, for instance, only 6 showed an increase in stock biomass over the last four years
GARM (2005).

tendency of government agencies and departments charged with responsibilities for natural resources and coastal ocean activities to be limited to some particular type of activity such as logging or fishing. Thus management focus has historically been narrow or sectoral and typically concerned with increasing production of desired commodities (Juda 2003). It is, however, "…understood that the collective result of these individual jurisdictional efforts is not enough to ensure the long-term sustainability of the entire Gulf of Maine region" (Hildebrand et al. 2002, 425). Clearly "… the Gulf of Maine is at a critical juncture, with new management approaches needed to protect its valuable ecosystems for generations to come" (Pesch and Wells 2004, *iv*).

It is against this backdrop that the Gulf of Maine Council on the Marine Environment has joined the growing chorus of institutions calling for a more integrated and sustainable ecosystem-based approach to the management of the human activities that impact an ecosystem. Ecosystem-based management means that managers consider ecosystem health and integrity as a primary consideration in all management decisions that affect the ecosystem. In economic terms, EBM is an investment in natural resources (Pauly and Maclean 2003, 93). The Council expressly incorporates the need for sustainable resource use and intergenerational equity in its mission "…to maintain and enhance environmental quality in the Gulf of Maine and to allow for sustainable resource use by existing and future generations" of its citizens (GOMCb 2005).

While the Council does not expressly define "sustainable resource use," the goal of sustainable resource use in the management or regulation of human activities that impact the environment is generally thought to be at odds with traditional sector-by-sector management approaches employed at most levels in the United States (Mangel, Hofman et al. 1993; F.A.O. 1995a; Costanza, Andrade et al. 1998; EPAP 1999; Sutinen, Clay et al. 2000; Link 2002; USCOP 2005). Sustainable resource use, from a management and governance perspective, is achievable only when humans are included in the process and recognized as being a component of the ecosystem while learning to participate in ecosystems in ways that allow natural processes to replace what is used. Under such conditions an ecosystem is able to "… renew itself indefinitely and human use will be sustainable" (Sherman 1994).

Transitioning traditional governmental institutions into an integrated and holistic regime capable of managing human activities in a sustainable manner is no easy task. While sustainable conditions may have occurred in some cultures in some places in the past, the question of how modern societies can live sustainably on the planet as it is now has been described as "*the* greatest challenge facing humankind and ecology is essential to addressing this challenge" (Mangel, Hofman et al. 1993). Put more succinctly, while many have cited the need for sustainable governance, there exist few real-world examples of institutional arrangements designed for the sustainable regulation of natural resource protection and use.

In order to better address these challenges, the Gulf of Maine Council on the Marine Environment is in the process of developing its 2006 – 2011 five year action plan, its fourth action plan. To help inform the process there is a need to survey the existing statutory and institutional framework in the jurisdictions that border the Gulf of Maine.

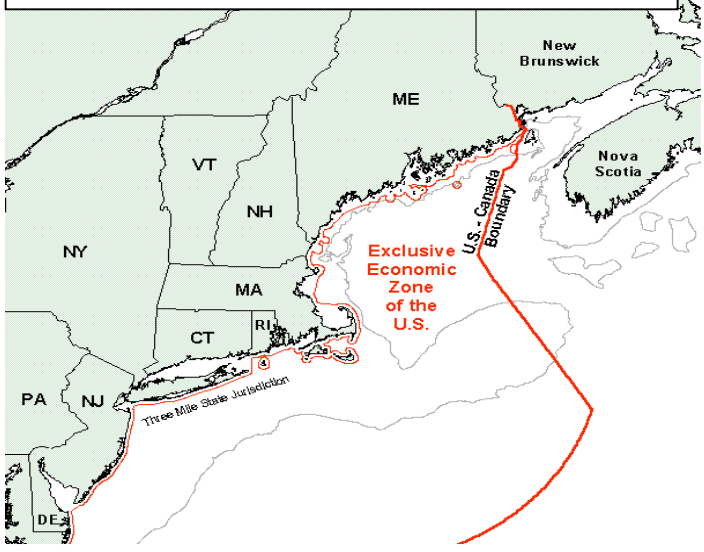
The purpose of this paper is to identify and summarize the most pertinent federal and state (i.e. Maine, New Hampshire and Massachusetts) governmental units, statutes, regulations and rules on the United States side of the Hague line. Agencies and institutions at state and federal levels are identified and their mission statements and/or policy positions are set forth. Local government involvement is discussed in the context of state and federal statutes that impose certain zoning and water quality measures upon coastal community governments. Finally, an analysis is included that attempts to identify the areas in which existing law either diverges from or is consistent with the mission and goals of the Gulf of Maine Council. Tables summarizing the text of this report, including potential funding sources (Appendix A), statutes cited (Appendix B), and a synthesis of GOMC goals and U.S. federal and state agencies and programs (Appendix C) have been added for the convenience of the reader. Ultimately it the goal of this exercise to help the Gulf of Maine Council consider steps to overcome or harmonize the fragmented focus and features of the existing sectoral institutional and governance approach and the help resolve the overlap and conflicts in jurisdiction among and between levels of government impacting management at the land-water interface.

2.0 A Survey of United States Federal and State Laws in the Gulf of Maine Region

2.1 Environmental Regulation and U.S. Constitutional Federalism: A Primer

The purpose of this chapter is to summarize the U.S. federal, state and local public laws that have been enacted to protect the environment or impact the activities that affect the Gulf of Maine ecosystem. Excluded from this analysis are issues and analysis of the common (or "private") law, including tort law and related causes of action for nuisance, trespass, abatement and the like. While the common law is ever present and remains a viable and oft-used tool for litigants involved in environmental disputes asserting rights and seeking remedies between identifiable parties, the public laws as passed by legislative bodies provide a better indicator of the state of governmental understanding of environmental issues and trends.

Figure 1 Gulf of Maine Region Political Boundaries



The public law operates when a governmental body takes some form of initiative, e.g. enacts legislation. It is constructed from thousands of statutes, ordinances and regulations that may emanate from any of the three levels of government: federal, state and local. Regulatory law is derived from legislative enabling statutes that delegate authority to administrative agencies to promulgate and implement regulations. The actions of

agencies must be authorized by and conform to the underlying statutory requirements. Administrative agencies also perform quasi-judicial adjudicatory functions including permitting and enforcement. While an in-depth treatise on fundamental U.S. constitutional or administrative law is beyond the scope of this assignment, a brief discussion of the role that the federal, state and local governments play in the public law scheme may prove helpful.

Laws and regulations can come from a variety of sources. Bills may be introduced in the U.S. House of Representatives or U.S. Senate and may emerge as new federal legislation. Similarly, laws may be passed by any of the state legislatures and codified as state legislation. As figure 1 demonstrates, integrated governance of the coastal region in the Gulf of Maine is already jurisdictionally challenged due to the split in jurisdictions between the near-shore (i.e. within 3 miles of shore plus areas of Massachusetts Bay) state jurisdiction and the offshore federal jurisdiction. In environmental matters, of course, there may be tension inherent in this scenario. The interest of the U.S. Congress may differ from those of an individual state and an environmental limitation passed by Congress may be resisted by an individual state. The Supremacy Clause of Article VI, however, is clear:

> This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, and any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.

Thus federal law generally trumps state law. If Congress passes a law in a subject area, states are not free to pass laws that conflict with federal mandate. On the other hand, the Constitution does not grant the U.S. Congress the unfettered ability to legislate on all matters or issues. The Tenth Amendment to the U.S. Constitution makes it clear that Congress may only legislate on matters where the Constitution has granted them the express authority to do so:

> The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

While the powers reserved for Congress are limited by the Tenth Amendment expressly set forth in the Constitution, environmental statutes passed by Congress typically clear this hurdle by basing such legislation on the power granted to Congress by Article 1, Section 8 of the U.S. Constitution "to regulate Commerce…among the several States…."

Thus it can be seen that the supremacy of federal law, while critically important for environmental regulation, is also a frequent source of tension between federal and state governments. The tension becomes more understandable when national environmental legislation is viewed in the context of (1) the states' historical desire to retain as much

sovereignty as possible and (2) the fact that until the 1970's environmental regulation was considered a state function inherent within the state police power to regulate for the health, safety, and welfare of its citizens (Plater, Abrams et al. 2004).

The potentially antagonistic conflicts between state sovereignty and police power versus federal supremacy are often reconciled by the creation of a presumption in favor of the validity of concurrent regulation by both the federal and state governments. This "presumption of concurrency" means that state regulation is permitted absent additional indications that the federal government intends to employ its supremacy to block state activity. Thus a federal statute regulating some activity that impacts the Gulf of Maine ecosystem may accomplish its mandate with a wide range of options pertaining to the degree of state involvement. At its most restrictive, a federal statute could expressly preempt state regulation as in the nuclear safety provisions of the Atomic Energy Act of 1954[2]. Most federal statutes, however, leave room for the states to regulate more stringently than federal law.

With these jurisdictional issues in mind, what follows is a survey of the federal and state departments and agencies and the relevant statutes reflecting the policy and priorities within their jurisdiction.

2.2 Federal Agencies and Statutes with Significant Impact on the Gulf of Maine

2.2.1 General

National Environmental Policy Act, 42 U.S.C. §§ 4321 *et seq.* Signed into law on January 1, 1970, NEPA's chief contribution to environmental regulation is that it requires that an environmental impact statement accompany any major federal action significantly affecting the human environment. NEPA applies to all federal agencies and to any project requiring a federal permit or in which a federal agency exercises discretion over the outcome.

Oceans Act of 2000, 33 U.S.C. §§ 857 *et seq.* The purpose of the Act was to establish a commission to make recommendations to Congress and the President for coordinated and comprehensive national ocean policy that promotes, *inter alia,* responsible stewardship of ocean and coastal resources and closer cooperation amongst all government agencies and departments. Its final report, "An Ocean Blueprint for the 21st Century" was released in July, 2004, and makes sweeping recommendations on a wide range of ocean and coastal issues, including proposals for ocean governance through a National Ocean Council and enhanced, flexible regional governance regimes (USCOP 2004). The recommendations of the Commission, however, have thus far failed to garner Congressional

[2] 42 U.S.C. §§2011 *et seq.*

attention and few, if any, of the recommendations put forth by the Commission have been enacted into law to date.

Submerged Lands Act, 43 U.S.C. §§ 1301 *et seq*. The Act grants coastal states title to offshore lands within their historic boundaries, generally up to three miles from the coastline, as well as the rights to the natural resources on or within those lands. The federal government relinquished its claims to the lands and resources, but maintained the right to regulate offshore activities for national defense, international affairs, navigation, and commerce.[3] In other words, the Act made clear that states were free to exercise jurisdiction over activities within their historic 3 mile limit.

2.2.2 National Oceanographic and Atmospheric Administration

NOAA was established as a result of the 1969 Stratton Commission. Although it was originally envisioned as a cabinet-level twin to NASA, it was ultimately placed in the Department of Transportation by then-President Richard Nixon. NOAA's broad mandate includes a number of marginally connected divisions, including the National Weather Service, federal marine science, marine sanctuaries, fisheries managements (beyond state waters) and coastal management (through state agencies with approved coastal management plans). For purposes pertinent to the ecosystem-based management of the coastal margin, NOAA's most recent assessment sets forth a mission statement: "To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social and environmental needs" (NOAA 2004). Among NOAA's five expressed goals is to "Protect, Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management" (NOAA 2004). The following are summaries of federal statutes enforced or primarily implemented (NOAA shares implementation duties with other federal and state agencies pursuant to several statutes) by NOAA:

Coastal Zone Management Act, 16 U.S.C. **§§** 1451 et seq. Enacted by Congress in 1972 for the purpose of promoting the "…national interest in the effective management, beneficial use, protection, and development of the coastal zone." The CZMA is an example of cooperative federalism that addresses both land use and critical area protection through state coastal management plans. The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division (CPD) within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (OCRM). The CPD is responsible for advancing national coastal management objectives and maintaining and strengthening state and territorial coastal management capabilities (OCRM 2003). State coastal management plans must give must balance environmental and economic factors and give "…full consideration to ecological, cultural, historic, and esthetic values as well as to needs for

[3] http://ipl.unm.edu/cwl/fedbook/sublands.html

compatible economic development."[4] Without specifically authorizing federal land use controls, the CZMA attempts to assure implementation of state coastal management programs by (1) authorizing the suspension of federal funding if a state fails to adhere to its federally approved plan, and (2) mandating that any federal activity within or impacting a state's coastal zone be consistent with that state's approved coastal management program (the "federal consistency" provision).

Another important component of the CZMA was passed as part of the 1990 Reauthorization Amendments. The **Coastal Nonpoint Pollution Control Program**, 16 U.S.C. § 1455b, included a program aimed at addressing nonpoint source pollutants. More specifically the amendments required participating states to prepare a Coastal Nonpoint Pollution Control Program that mandated at minimum (1) a description of a range of methods, and practices designed to control nonpoint source pollutants, (2) a description of the activities and locations for which each measure was suitable; (3) an identification of the individual pollutants or classes of pollutants which would be controlled by the measures and the water quality impact of the measures; (4) quantitative estimates of the pollution reduction effects and costs of the measures; (5) a description of the factors which should be taken into account in adopting the measures to particular sites, and (6) necessary monitoring techniques to accompany the measures to assess over time their success in reducing pollution loads and improving water quality. Funding for the development and implementation of these measures and other priorities was provided for in the amendments via the Coastal Zone Enhancement Grants Program (Beatley, Brower et al. 1994).

Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801 *et seq.* Originally enacted in 1976 the Act formally established U.S. control over all fishing outside the 3 mile state territorial limit and within the 200 mile exclusive economic zone ("EEZ"). As amended in 1996 by the Sustainable Fisheries Act, the Acts primary purposes include taking immediate action to conserve and manage the fishery resource off the U.S. coasts and U.S. anadromous species and Continental Shelf fishery resources; promote domestic commercial and recreational fishing under sound conservation and management principles; provide for preparation and implementation of fishery management plans to achieve and maintain the optimum yield of each fishery on a continuing basis; establish Regional Fishery Management Councils (including the New England Fishery Management Council) to protect commercial fishery resources through preparation, monitoring, and revision of plans that allow for participation of states, fishing industry, consumer and environmental organizations; encourage the development of underutilized U.S. fisheries and provide for the identification and protection of essential fish habitat. The Act is administered and implemented through the National Marine Fisheries Service ("NMFS").

[4] 16 U.S.C. § 1452(2)

Marine Mammal Protection Act, 16 U.S.C. §§ 1361 *et seq.* Protection for marine mammals is split between agencies. NMFS has the responsibility for the protection of cetaceans (whales, porpoises and dolphins) and pinnipeds (seals and sea lions) – but not walruses. The U.S. Fish and Wildlife Service ("USFWS") is responsible for the protection of walruses, sea otters, polar bears, and manatees. Sea turtles at sea are protected by NMFS; on land they are the responsibility of USFWS (Helvarg 2001). The Act also creates the Marine Mammal Commission to oversee marine mammal policies and programs.

Endangered Species Act, 16 U.S.C. §§ 1531-1543, as amended. The ESA was enacted in 1973 to provide for the conservation of species shown to be in danger of extinction throughout all or a significant portion of their range. The purpose of the Act is to "…provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved…"[5] NOAA (through NMFS) makes determinations as to marine species and Pacific salmon that are endangered or threatened and designates critical habitat and recovery plans for marine species listed under the ESA. The USFWS is responsible for designation and recovery plans for non-marine species. Included within the Act's provisions is a duty for the Secretary of Commerce or Interior to cooperate and consult with the States before acquiring any interest in land or water for the purpose of conserving any endangered or threatened species.[6]

Marine Protection, Research and Sanctuaries Act, 33 U.S.C. §§ 1401 *et seq.* Title III of the act, knows as the National Marine Sanctuaries Act[7] authorizes NOAA to administer the National Marine Sanctuary Program. The sanctuary program authorizes the Secretary of Commerce to create national marine sanctuaries to protect natural and cultural resources. In the Gulf of Maine, Stellwagen Bank National Marine Sanctuary was designated in accordance with the Act. It protects some 842 square miles in an area located 25 miles east of Boston and stretches between Cape Ann and Cape Cod at the mouth of Massachusetts Bay. Its boundaries include the submerged lands of Stellwagen Bank as well as Tillies Bank (to the northeast) and southern portions of Jeffrey's Ledge (north of Stellwagen Bank).[8] Similarly, the National Estuarine Research Reserve System sets up a partnership between NOAA and coastal states, including those bordering the Gulf of Maine, for the protection and long term study of estuarine land and water. The Wells Reserve in Maine and the Great Bay Reserve in New Hampshire are examples of the NERRS in the Gulf of Maine.[9]

Act to Prevent Pollution from Ships, 33 U.S.C. §§ 1901 *et seq.* As amended, the APPS prohibits the discharge of oil and noxious liquids and the disposal of garbage in offshore waters consistent with the International Convention for the

[5] 16 U.S.C. § 1531(b)
[6] 16 U.S.C. § 1535
[7] Not to be confused with the EPA's National Estuary Program, *supra*.
[8] http://www.sanctuaries.nos.noaa.gov/oms/omsstellwagen/omsstellwagennatset.html
[9] http://nerrs.noaa.gov/

Prevention of Pollution from Ships (i.e. "MARPOL"). APPS applies to all U.S. flag ships anywhere in the world and to all foreign flag vessels operating in the navigable waters of the United States or while at a port or terminal under the jurisdiction of the United States. The Act also prohibits the discharge of plastics, including synthetic ropes, fishing nets, plastic bags and biodegradable plastics, into the navigable waters and in areas offshore less than 25 nautical miles from the nearest land. Food waste or paper, rags, glass, metal, bottles, crockery and similar refuse cannot be discharges in the navigable waters or in waters offshore inside 12 nautical miles from the nearest land. Finally, food waste, paper, rags, glass, and similar refuse cannot be discharged in the navigable waters or in waters offshore inside three nautical miles from the nearest land.[10]

2.2.3 U.S. Environmental Protection Agency

The Environmental Protection Agency was created in 1970 during the administration of President Richard Nixon as the product of a groundswell of environmental activism. The EPA administers a variety of environmental laws and regulations. Its overall mission is to protect human health and the environment. Perhaps most relevant to the subject matter of this summary are various commitments that the EPA has made with respect to water quality and watershed management. The EPA has committed to the protection of human health by reducing exposure to contaminants in drinking water (including protecting source waters), in fish and shellfish, and in recreational waters. It has also committed to protecting the quality of rivers, lakes, and streams on a watershed basis and to protect coastal and ocean waters (EPA 2003). The statutes implemented and enforced in whole or in part by the EPA most pertinent to the regulation of the human activities that impact the Gulf of Maine ecosystem are summarized below.

The Clean Air Act of 1970, 42 U.S.C. §§ 7401 *et seq*. The focus of the EPA's Clean Air Act ("CAA") efforts is the National Ambient Air Quality Standards (NAAQS). State and federal regulation under the CAA has as its objective the attainment of air quality consistent with the NAAQS. Standards are set for "criteria" pollutants. The CAA is included in this report because the EPA has expressly recognized the nexus between air quality and the health of marine ecosystems. Currently many fish consumed in the Gulf of Maine region are subject to Food Consumption Advisories due to contaminants, including mercury, present in their tissues. Mercury is released into the air from coal-fired power plants and incinerators and is deposited onto land and water, working its way up the food chain through fish to people. The EPA has committed to a reduction of mercury released into the air from coal-fired power plants by 22 tons from their 2000 level of 48 tons (EPA 2003).

Clean Water Act, 33 U.S.C. §§ 1251 *et seq*. Officially known as the Federal Water Pollution Control Act Amendments of 1972, the goal of the Clean Water Act ("CWA") is to "…restore and maintain the chemical, physical, and biological

[10] http://www.csc.noaa.gov/opis/html/summary/apps.htm

integrity of the Nation's waters."[11] The amendments attempt to achieve maximum "effluent limitations on point sources" of pollution as well as achieve acceptable water quality standards.[12]The CWA contains a broad range of regulatory tools designed to attain its regulatory goals and objectives. The statute prohibits discharges of any pollutant[13] unless authorized pursuant to the permit requirements of the National Pollution Discharge Elimination System.[14] Implementation of the permit provisions and other sections of the CWA rely upon an express process for federal/state cooperation.[15] The EPA or approved State (or States if there is an approved interstate compact), and the U.S. Army Corps of Engineers, in consultation with USFWS, NMFS, and State resource agencies, also control the discharge or placement of dredged or fill material.[16]

The focus of the EPA's CWA efforts has been the establishment of technology-based standards for the regulation of point source dischargers of pollutants (outfall pipes, municipal sewage treatment plants, vessels, etc.). States are now being required to turn their attention on non-point discharges and establish water quality standards to upgrade waters that remain polluted after the application of technology-based requirements.[17]

Finally, amendments to the CWA since its enactment have added a variety of programs to the EPA's water quality regulatory arsenal. The 1987 amendments, augmented by the 2000 amendments, created the **National Estuary Program** ("NEP") to improve the quality of estuaries of national importance. The NEP is designed to promote the restoration of estuary habitat, develop a national estuary habitat restoration strategy, and provide the funds for the establishment, research

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[11] 33 U.S.C. § 1251(a). The goals section of the act also provides, *inter alia*, for elimination of the discharge of pollutants into navigable waters by 1985 and the absolute prohibition of discharges of toxic pollutants (not an enforceable requirement but a rebuttable presumption that pollution prevention is the most desirable form of pollution control
Plater, Z. J. B., R. H. Abrams, et al. (2004). Environmental Law and Policy: Nature, Law. and Society. New York, Aspen Publishers., 626 -627).

[12] The U.S. Supreme Court has made it clear that States play a key role in the enforcement and implementation of the CWA. NPDES permits are secured in the first instance from EPA consonant with its policy "to recognize, preserve, and protect the primary responsibilities and rights of the States to prevent, reduce, and eliminate pollution." States with an EPA approved CWA enforcement program may issue NPDES permits "for discharges into navigable waters within its jurisdiction." Further, States play a key role in the determination of acceptable water quality standards, as "effluent limitation' is defined by the CWA as"…any restriction established by a State…on quantities, rates, and concentrations of chemical, physical, biological or other constituents which are discharged from point sources…including schedules of compliance." Thus States may determine "how clean is clean" as well as the schedule for the clean-up of polluted waters within the state. U.S. Environmental Protection Agency v. California, 426 U.S. 200 (1976)

[13] 33 U.S.C. § 1311(a)

[14] 33 U.S.C. § 1342(a)

[15] 33 U.S.C. § 1342(b)

[16] 33 U.S.C. § 1344; http://www.epa.gov/owow/wetlands/facts/fact10.html

[17] In brief, the CWA requires that states identify waters that are and will remain polluted after the application of technology standards; prioritize these waters based on the severity of their pollution; and establish 'total maximum daily loads' ("TMDLs") for these waters at levels necessary to meet applicable water quality standards. States are required to submit their inventory and TMDLs to EPA for approval. 33 U.S.C. § 1313(d); http://www.epa.gov/owow/tmdl.

and funding for NEP-designated estuaries.[18] The 2000 amendments also enacted the **Beaches Environmental Assessment and Coastal Health Act of 2000** ("BEACH"). BEACH mandates that states with coastal recreation waters adopt water quality criteria and standards for designated pathogens and pathogen indicators. States must submit water quality criteria and standards to the EPA and demonstrate that the standards are sufficient to protect human health. Funding for the establishment of the plan and for monitoring and implementation are available through the Act.[19]

2.2.4 U.S. Army Corps of Engineers

Not actually a branch of the armed services, much of the mission of the U.S. Army Corps of Engineers ("USACE") involves providing engineering, design and construction pertaining to national infrastructure, homeland security, war preparations and combat support. It is included in this survey because of its statutory mandates related to environmental and water resource matters in the United States including dredging, wetlands activity permitting and ecosystem restoration efforts. The Environmental Operating Principles of the USACE provide insight into the agency's emphasis and include the need to achieve environmental sustainability. The principles expressly recognize that an environment maintained in a healthy, diverse and sustainable condition is necessary to support life and stresses the need to assess and mitigate cumulative impacts to the environment (USACE 2002). Further, Section 306 of the **Water Resource Development Act 1990** made environmental restoration one of the primary missions of the Corps of Engineers, permitting the Corps to undertake studies and build projects which restore habitat.[20] A summary of selected statutes that rely in whole or in part on the leadership or participation of the USACE is set forth below.

Rivers and Harbors Act of 1899, 33 U.S.C. §§ 403 *et seq*. Sections 9 and 10 of Rivers and Harbors Act ("RHA") grants the USACE the ability to regulate and permit virtually all construction in the navigable waters of the United States or on the outer Continental Shelf. It also prohibits any unauthorized obstruction of navigable waters. Furthermore it might be inferred that the RHA provides the basis for the USACE Regulatory Program encompassing a variety of programs that impact coastal construction, wetland permitting, flood control projects, beach protection and reconstruction, and invasive species control.[21] The extent of the USACE Regulatory Program may be seen by reviewing the **Water Resources Development Act**, 33 U.S.C. §§ 2201 *et seq.*, which is enacted approximately every 3 or 4 years and sets forth the authorized USACE projects and enabling legislation or regulation.

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[18] 33 U.S.C. § 1330; http://www.epa.gov/nep. Estuary programs within the Gulf of Maine watershed include the New Hampshire Estuary Program encompassing Great/Little Bays and Hampton Harbor, the Casco Bay Estuary Partnership in Maine, and the Massachusetts Bay Program encompassing Massachusetts and Cape Cod Bays. http://www.epa.gov/nep.

[19] 33 U.S.C. § 1313(i); http://www.epa.gov/waterscience/beaches/act.html

[20] 33 USC § 2316; See also Appendix A.

[21] http://www.usace.army.mil/inet/functions/cw/cecwo/reg/

Marine Protection, Research and Sanctuaries Act, 33 U.S.C. §§ 1401 *et seq.* Title I of this Act is commonly known as the **Ocean Dumping Act** and expressly provides that "…unregulated dumping of material into ocean waters endangers human health, welfare, and amenities, and the marine environment, ecological systems and economic potentialities."[22] The USACE is authorized to issue permits for dredging and for the transportation of dredged materials. The EPA remains responsible for the designation of appropriate dump sites.[23]

Estuary Restoration Act of 2000, 33 U.S.C. §§ 2901 *et seq.* The Estuary Restoration Act ("ERA") addresses the restoration of estuary habitat and affects some 30 states including Maine, New Hampshire, and Massachusetts. The ERA creates the national Estuary Habitat Restoration Strategy for the purpose of creating and maintaining effective partnerships within the Federal government and with the private sector, providing Federal assistance for and promoting efficient financing of estuary habitat restoration projects; and developing and enhancing monitoring, data sharing, and research capabilities. It also creates the Estuary Habitat Restoration Council comprised of representatives of the USACE, NOAA, EPA, USFWS (Dept. of Interior), and USDA. The Council is responsible for the development of a national strategy to ensure a comprehensive and integrated restoration approach and foster coordination of federal and non-federal restoration activities. The Council recommends projects to the Secretary of the Army who then decides which projects to fund. The goal of the strategy is to restore 1,000,000 acres of habitat by 2010. The act defines "estuary habitat restoration activity" as an activity that results in improving degraded estuaries or estuary habitat or creating estuary habitat (including both physical and functional restoration), with the goal of attaining a self-sustaining system integrated into the surrounding landscape.[24]

2.2.5 U.S. Fish and Wildlife Service

The USFWS is an agency within the U.S. Department of Interior. Its mission is to work "…with others to preserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people" (USFWS 2000). To help with its mission the USFWS has adopted an ecosystem approach to the management. It describes its ecosystem approach as comprehensive and based on all of the biological resources within a watershed. Consistent with this approach, its field offices have been geographically aligned to conform to watershed boundaries.[25] It also provides additional services and data including the National Wetlands Inventory.[26] Further, the USFWS is involved with enforcement, implementation and conservation on a number of fronts pertinent to the Gulf of Maine region.

[22] 33 U.S.C. § 1401
[23] 33 U.S.C. § 1413
[24] 33 U.S.C. § 2902
[25] http://www.fws.gov/ecosystems/
[26] http://wetlands.fws.gov/statusandtrends.htm

USFWS Coastal Program

The Coastal Program focuses the USFWS efforts in bays, estuaries and coastal regions of the United States. The purpose of the Coastal Program is to conserve fish and wildlife and their habitats in order to support healthy coastal ecosystems. The program is guided by 4 explicit goals: (1) Serve coastal communities by providing assessment and planning tools to identify priority habitats that should be protected and restored; (2) Conserve pristine coastal habitats through support of locally-initiated conservation efforts; (3) Restore degraded coastal wetland, upland, and stream habitats by working with partners to implement on-the-ground projects, and (4) Focus resources through conservation alliances that leverage the financial and technical resources of our partners and multiply the impact of the taxpayer's dollar.[27] The Coastal Program currently provides funding to 21 high-priority coastal ecosystems including the Gulf of Maine.[28]

National Wildlife Refuge Administration Act, 16 U.S.C. §§ 668dd *et seq*. This act consolidated the various categories of lands administered by the Department of the Interior into a single National Wildlife Refuge System administered by the USFWS. The Act establishes a unifying mission for the Refuge System, a process for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. This Act states first and foremost that the mission of the National Wildlife Refuge System is focused singularly on wildlife conservation. The Gulf of Maine is ringed by numerous parcels of land protected by and administered under the Act.

Coastal Barrier Resource Act, 16 U.S.C. §§ 3501 *et seq*. The CBRA identifies undeveloped coastal barrier lands and associated marine or aquatic areas that serve as barriers protecting coasts along the Atlantic, Gulf of Mexico and the Great Lakes. The Act prohibits federal expenditures or subsidies that tend to encourage development of such areas. While private or non-federal money may be used for permitted development, subsidies such as participation in the National Flood Insurance Program are not permitted.

National Invasive Species Act, 16 U.S.C. § 4701, et seq. The National Invasive Species Act ("NISA") was passed in 1996 amending the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. The 1990 Act established the Aquatic Nuisance Species (ANS) Task Force to direct ANS activities annually. The Task Force is co-chaired by the U.S. Fish and Wildlife Service (Service) and the National Oceanic and Atmospheric Administration. Other members include the National Marine Fisheries Service, Environmental Protection Agency, Department of Agriculture, the U.S. Coast Guard, the U.S. State Department, and the Army Corps of Engineers. NISA furthered ANS activities by calling for ballast water regulations, the development of State management plans and regional panels to combat the spread of ANS, and additional ANS research.

[27] http://www.fws.gov/coastal/CoastalProgram/
[28] http://www.fws.gov/northeast/gulfofmaine/

Guidelines issued to prevent the introduction and spread of nonindigenous species in waters of the United States by ballast water operations and other operations of vessels equipped with ballast water tanks are voluntary.[29]

2.2.6. U.S. Department of Agriculture

The USDA is the cabinet level department ultimately responsible for the regulation of two important categories of activities that impact the Gulf of Maine ecosystem: agriculture and forestry. The U.S. Forest Service expressly adopted an ecosystem-based approach to forest management in 1992 in conjunction with the United Nations Conference on Environment and Development ("UNCED") Earth Summit in Rio de Janeiro.[30] Since that time USDA agricultural regulation has increasing supported funding for farmers to adopt practices designed to reduce non-point source run-off of pesticides and fertilizer and encourage open space preservation.

Farm Security and Rural Investment Act of 2002, 7 U.S.C. §§ 7901 *et seq.* The most recently enacted farm bill adopts a variety of programs expressly designed to restore, protect and enhance rural lands. The Wetlands Reserve Program ("WRP") provides incentives for landowners to protect wetlands in exchange for retiring marginal land from agriculture. The Conservation Security Program provides payments to producers who practice good stewardship on their agricultural lands and incentives for those who want to do more. The Environmental Quality Incentives Program ("EQIP") permits farms to receive financial and technical help to install or implement structural and management conservation practices on agricultural land that will reduce non-point source pollution, reduce emissions, reduce soil erosion and sedimentation and promote at-risk species habitat conservation. The Wildlife Habitat Incentives Program ("WHIP") provides technical and financial assistance to landowners and others to create high quality wildlife habitats.

2.3 State Legislation and Agencies in the Gulf of Maine Region

As discussed in the introduction, states play a critical role in the regulation of the human activities that impact the Gulf of Maine ecosystem through the exercise of police power authority to protect the health, safety and welfare of their citizens as well as through the delegation of enforcement and implementation responsibilities in accordance with federal legislation. Although an exhaustive review of applicable state statutes and pertinent state

[29] http://www.fws.gov/contaminants/Issues/InvasiveSpecies.cfm; It should also be noted that Executive Order 13123 of February 3, 1999, directs federal agencies whose activities affect the status of invasive species to work together to (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them. Federal Register: Feb 8, 1999 (Volume 64, Number 25)

[30] http://www.fs.fed.us/global/news/article4.htm

agencies is beyond the scope of this report, what follows is a brief survey of some of the agencies and statutes that underpin state regulatory activities for those states that directly border the Gulf of Maine.

2.3.1 Massachusetts

Executive Office of Environmental Affairs

The Massachusetts Office of Environmental Affairs ("EOEA") is the umbrella administrative agency responsible for the coordination and oversight of a host of Massachusetts environmental initiatives and agencies. Included within its oversight are the Office of Coastal Zone Management, the Massachusetts Environmental Protection Act, the Division of Conservation Services, the Smart Conservation strategy, the Office of Technical Assistance for Toxic Use Reduction, the Massachusetts Conservation Trust, and others. Set forth below are summaries of a variety of statutes and administrative offices coordinated by the EOEA pertinent to the Gulf of Maine region.[31]

Massachusetts Environmental Protection Act, (M.G.L. c. 30 ss 61-62H and 301 CMR 11.00). MEPA requires project proponents file an Environmental Impact Report for projects that meet certain threshold requirements that trigger state agency action. It mandates the gathering of information by project proponents and provides an opportunity for input by the public and other involved agencies and stakeholders.

Office of Coastal Zone Management administers the Coastal Zone Management Act (16 USC §§1451 *et seq*. and 15 CFR 930; M.G.L. c 21A §§ 2, 4 and 301 CMR 20.00). In Massachusetts, the Office of Coastal Zone Management is responsible for the administration and implementation of its federally approved Coastal Zone Management Plan ("CZMP"). Its mission is "…to balance the impacts of human activity with the protection of coastal and marine resources..."[32] The CZMP articulates policies and permitting procedures affecting marine habitat, water quality, protected areas, public access, energy, ocean resources and coastal growth management in the coastal zone.[33] In addition to assuring that projects comply with the CZMP, the Office of Coastal Zone Management conducts federal consistency reviews to determine whether federal activities undertaken or authorized by the federal government are consistent with the state CZMP.

[31] http://www.mass.gov/envir/
[32] http://www.mass.gov/czm/
[33] The Coastal Zone in Massachusetts is that area bounded by the outer limit of the Commonwealth's jurisdiction as established by the United States from time to time; the northern and southern lateral seaward boundaries of the Commonwealth as established by interstate compact, agreement, judicial decision, or as otherwise provided by law; and 100 feet inland of the roads, rail lines, or rights of way delimited in the CZM Coastal Atlas. 301 CMR 21.00; http://www.mass.gov/czm/fcrczmregs.htm#5

The Massachusetts Ocean Management Initiative and Task Force was created in recognition of the increasing array of coastal and ocean challenges and conflicts. The Massachusetts Office of Coastal Zone Management became the central coordinator and facilitator of the Ocean Management Initiative. The Initiative was one of the first attempts by a state to develop a comprehensive plan for multiple ocean uses. The initiative created a Management Task Force in June of 2003 and charged them with investigating ocean use trends and existing governance mechanisms; drafting recommendations for administrative, regulatory, and statutory changes; and developing ocean management principles that address complexities of present and future multiple use planning. The task force conducted public meetings and received input from stakeholders over a 10 month period. The efforts of the task force resulted in the release of its final report and recommendations entitled *Waves of Change: The Massachusetts Ocean Management Task Force Report and Recommendations*. Recommendations of the task force include the strengthening of state agencies to better address environmental, planning, and public trust issues in both state and federal waters; establishing an ecosystem-based protocol to improve management of federal waters; and initiating ocean education and stewardship initiatives.[34] Legislation intended to implement the recommendations of the task force was introduced into the Massachusetts legislature in March, 2005.[35]

Division of Marine Fisheries

The mission of the DMF is to provide benefits to the public by managing "… the Commonwealth's living marine resources and the harvesting of those resources by the commercial and recreational fisheries, while maintaining a diverse number of self-sustaining fish populations at healthy levels of abundance in balance with the ecosystem."[36] The DMF is responsible for the management of living marine, estuarine, and anadromous resources within the waters of the Commonwealth. In doing so, it works closely with NOAA Fisheries, the New England Fisheries Management Council, the Mid-Atlantic Fisheries Management Council, and the Atlantic States Marine Fisheries Commission to craft regulations that create sustainable, healthy fisheries in compliance with applicable Fishery Management Plans.

Department of Environmental Protection

Article XCVII of the Massachusetts Constitution underpins this department's role to help guarantee the people's right to "clean air and water", as well as "the natural scenic, historic and aesthetic qualities of the environment."[37] DEP is the state agency responsible for protecting human health and the environment by ensuring

[34] http://www.mass.gov/czm/oceanmanagement/waves_of_change/index.htm
[35] http://www.mass.gov/czm/oceanmanagement/orca/index.htm
[36] http://www.mass.gov/dfwele/dmf/information/mission.htm#x; Massachusetts Marine Fisheries Regulations are codified at 322 CMR; http://www.mass.gov/dfwele/dmf/commercialfishing/cmr_index.htm
[37] Massachusetts Constitution, Article XCVII

clean air and water, the safe management and disposal of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources.[38] The DEP is headed by a Commissioner with three deputy commissioners (including the Deputy Commissioner for Operations and Programs), a general counsel, and two directors reporting directly to the commissioner. DEP's programs are divided between three programmatic bureaus: The Bureau of Resource Protection, the Bureau of Waste Prevention and the Bureau of Waste Site Cleanup. The responsibility for responsible for identifying critical inland and coastal water resources and devising strategies for protecting and preserving them fall within the Bureau of Resource Protection. Permitting for groundwater discharges, surface water discharges, estuary and watershed programs and other media regulation also fall within the Bureau of Resource Protection. Air and water planning units fall within the Bureau of Waste Prevention.[39]

Waterways and Coastal Protection: Chapter 91

Massachusetts General Law Chapter 91 provides the legislative basis charging the Department of Environmental Protection with the responsibility for the protection of the Commonwealth's interests in its harbors, tidelands, and waters and with acting as a steward of the public's interest in the those lands.[40] It is the basis for the Commonwealth's waterways licensing program. It is also designed to protect traditional maritime industries from displacement by modern development. The Waterways Regulation Program, the section of DEP that oversees Chapter 91, is the primary division charged with implementing this codification of the traditional "public trust doctrine."[41] The DEP Waterways Regulation Program is intended to protect access to the water's edge for fishing, fowling and navigation, protect navigation rights, protect and promote tidelands as a workplace for commercial fishing, shipping, passenger transportation, boat building and repair, marinas and other activities for which proximity to the water is either essential or highly advantageous, and protect Areas of Critical Environmental Concern, ocean sanctuaries and other ecologically sensitive areas from unnecessary encroachment by fill and structures. Its provisions apply to any project located in, on, over or under tidal waters seaward to the three mile Commonwealth territorial limit. It also applies to filled tidelands, Great Ponds (ponds in excess of 10 acres), many non-tidal rivers and streams. The basic activities subject to Chapter 91 authorization include structures, regardless of size, filling or placement of unconsolidated materials including material placed for purposes of shoreline protection or beach nourishment, dredging of any materials or bottom sediment and sand in any waters of the Commonwealth, any change in use of a structure for

[38] http://www.mass.gov/dep/about/missionp.htm
[39] [39] http://www.mass.gov/dep/about/contacts.htm
[40] M.G.L.c. 91§ 2; 310 Code Mass. Regs § 9.01 (2) (2000)
[41] At its core, the public trust doctrine stands for the proposition that certain resources are held in trust by the government for the benefit of the public.

a purpose unrelated to the authorized or original use, and any change in the dimensions or demolition/removal of a structure as originally approved.[42]

Air Quality

Air pollution controls and regulation are the responsibility of the DEP's Air Program Planning Unit using powers delegated to it by the EPA. The program concentrates on controlling ambient emissions of air pollutants, including emissions of toxic compounds, from stationary sources (e.g., industrial) and mobile sources (e.g., automobiles) that contribute to violations of federal ambient air quality standards. In addition to controlling the federally CWA priority pollutants and hazardous air pollutants ("HAPS"), additional programs provide some increased levels of regulation and air pollution prevention in Massachusetts,[43] including participation in a Zero Mercury Program in furtherance of the New England Governors and Eastern Canadian Premiers Regional Mercury Action Plan of 1998 (NEG/ECP 1998).[44]

Water Quality

Under the Massachusetts Clean Water Act the responsibility for water pollution control and the prevention, control, and abatement of water pollution rests with the DEP.[45] Pursuant to the EPA's National Pollutant Discharge Elimination System (NPDES) Program, all point source discharges of pollutants are prohibited unless a NPDES permit is procured. Since Massachusetts is a non-delegated NPDES permit states, all permits are jointly issued by EPA and DEP and are equally and separately enforceable by both agencies. Permits regulate discharges with the goals of: (1) protecting public health and aquatic life, and (2) assuring that every facility treats wastewater.[46] The department's TMDL strategy contemplates the completion of impaired water classification by 2012, after which an implementation plan allocating allowable pollutant loads by watershed will be developed.[47]

The DEP manages wetland issues through its Wetlands Program. The statutes underpinning the program include the Wetlands Protection Act as amended by the Rivers Protection Act.[48] The purposes of the program are the protection of private or public water supply, protection of groundwater, flood control, prevention of storm damage, prevention of pollution, protection of land containing shellfish, protection of wildlife habitat, and protection of fisheries. The Rivers Protection Act establishes a state policy for protecting the natural integrity of the

[42] http://www.mass.gov/dep/brp/waterway/about.htm
[43] http://www.mass.gov/dep/bwp/daqc/files/airtox.htm
[44] http://www.mass.gov/dep/bwp/daqc/files/airtox.htm
[45] M.G.L.c. 21, §§ 27, 53
[46] 40 CFR 122: EPA Administered Permit Programs: National Pollutant Discharge Elimination System; M.G.L. Ch. 21 §. 26-53: Massachusetts Clean Waters Act; 314 CMR 3.00: Massachusetts Surface Water Discharge Permit Program; http://www.mass.gov/czm/envpermitnpdes.htm
[47] http://www.mass.gov/dep/brp/wm/files/tmdlfs.pdf
[48] M.G.L. c.131, § 40.

Commonwealth's rivers and to establish open space along rivers. The Act also sets aside funds for the acquisition of lands bordering streams and rivers.

2.3.2 Maine

Coastal Zone Management

While the Maine Coastal Zone Management Plan received formal federal approval in 1984, the Maine Coastal Program ("MCP") was established in 1978 as an initial response to the passage of the federal CZMA. The CZMP, together with other coastal and land use programs, are administered through the Maine State Planning Office ("MSPO"), which facilitates a variety of partnerships among state, regional and local agencies. Under the Maine Coastal Program, the MSPO expressly recognizes that although coastal resources must be protected and conserved, residents must be able to thrive economically. The Maine Coastal Program strives to achieve a balance between resource protection and human uses.[49] With a coastal zone that extends for 5,300 miles and includes municipalities that border the coast, tidal waterways and territorial waters out to the three mile territorial limit the MSPO's Coastal Program undertakes or supports projects that promote sustainable economic development, encourage environmental stewardship and education, conserve and manage marine fisheries, reduce coastal hazards, and improve public access. The Maine State Planning Office is also the state agency designated to conduct federal consistency reviews of federal actions impacting the Maine coastal zone (MSPO 2002). Finally, Maine voters have made their priorities known by voting for bond issues designed to fund the acquisition and protection of land with "exceptional natural or recreational value." Thus among its other duties, the MSPO administers the "Lands for Maine Future" Program, identifying and facilitating the purchase and protection land identified under this program. To date, MSPO has assisted with the purchase of at least 139,000 acres, with an additional 53,500 acres protected through conservation easements. [50]

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[49] The legislative policy applicable to the **Coastal Program** is set forth at 18 M.R.S.A. § 1801:

> The Legislature finds that the Maine coast is an asset of immeasurable value to the people of the State and the nation, and there is a state interest in the conservation, beneficial use and effective management of the coast's resources; that development of the coastal area is increasing rapidly and that this development poses a significant threat to the resources of the coast and to the traditional livelihoods of its residents; that the United States Congress has recognized the importance of coastal resources through the passage of the United States Coastal Zone Management Act of 1972 and that in 1978 Maine initiated a coastal management program in accordance with this Act which continues to be of high priority; and that there are special needs in the conservation and development of the State's coastal resources that require a statement of legislative policy and intent with respect to state and local actions affecting the Maine coast.
>
> 1985, c. 794, Pt. A, § 11

[50] http://www.state.me.us/spo/lmf/

Department of Environmental Protection

Maine's Department of Environmental Protection ("MDEP") is the primary agency responsible for protecting and restoring Maine's natural resources and implementing and enforcing environmental laws. Its mission is straight forward: To prevent, abate and control the pollution of the state's air, water and land and to preserve, improve and prevent diminution of the natural environment of the State. MDEP is also directed to protect and enhance the public's right to use and enjoy the State's natural resources. Organizationally, three separate bureaus administer the department's environmental programs: Air Quality, Land and Water Quality, and Remediation and Waste Management. All three bureaus report to a Deputy Commissioner who reports to the Commissioner.[51] In addition, the Maine legislature created a 10 member appointed Board of Environmental Protection citizen "to provide informed, independent and timely decisions on the interpretation, administration, and enforcement of the laws relating to environmental protection and to provide for credible, fair, and responsible public participation in Department decisions." The Board shall fulfill its purpose through rulemaking decisions, decisions on selected permit applications, review of the Commissioner's licensing and enforcement actions and recommending changes in the law to the Legislature."[52]

Air Quality

Air quality regulation falls within the jurisdiction of the Bureau of Air Quality. The mission of the Bureau is to coordinate a statewide program to control present and future sources of air contaminants to assure the continued health, safety and general welfare of the people of Maine, to protect property values, and to protect plant and animal life. To fulfill this mission, the Bureau implements a two-pronged strategy focused on the improvement of air quality in those areas where air quality has degraded and the prevention of deterioration of air quality in areas where the air quality is acceptable.[53] Maine's Air program was created in response to Federal requirements under subsection 110 of the Clean Air Act and its State Implementation Plan ("SIP") has been approved by the EPA.[54] In addition to the regulation of priority and hazardous air pollutants mandated by the CAA, Maine's SIP also includes other toxic chemicals such as dioxin, furan and PCBs. Maine has also adopted a program to reduce mercury emissions, recognizing the link between mercury exposure and human health and the threat posed by human consumption of mercury-tainted fish and shellfish. In 1998 the Land and Water Council adopted a multidisciplinary approach Mercury Reduction Strategy for Maine that has resulted in an estimated reduction of overall mercury emissions by more than 75% from 1991 levels. Further, Maine

[51] http://www.maine.gov/dep/overview.htm
[52] 38 MRSA § 341-B; http://www.maine.gov/dep/bep/purpose.htm
[53] 38 M.R.S.A § 581; http://www.maine.gov/dep/air/overview.htm
[54] 40 CFR Part 52, Subpart U.; Maine statutes specific to the air program are codified at 38 M.R.S.A. §§581 through 608-A; regulations implementing the program set forth at Chapters 100 – 138 of the Department's Regulations.

participates in the 1998 New England Governors and Eastern Canadian Premiers Mercury Action Plan.[55]

Water Quality

Natural Resource Protection Act, 39 M.R.S.A. §§ 408 *et seq.* The policy articulated by this 1987 legislation provides:

> The Legislature finds and declares that the State's rivers and streams, great ponds, fragile mountain areas, freshwater wetlands, significant wildlife habitat, coastal wetlands and coastal sand dunes systems are resources of state significance. These resources have great scenic beauty and unique characteristics, unsurpassed recreational, cultural, historical and environmental value of present and future benefit to the citizens of the State and that uses are causing the rapid degradation and, in some cases, the destruction of these critical resources, producing significant adverse economic and environmental impacts and threatening the health, safety and general welfare of the citizens of the State…The Legislature further finds and declares that the cumulative effect of frequent minor alterations and occasional major alterations of these resources poses a substantial threat to the environment and economy of the State and its quality of life. 39 M.R.S.A. § 408A

Under the Act a permit is required[56] whenever any "activity" is proposed on or over any protected natural resource or in an area located adjacent to a coastal wetland, great pond, river, stream, wetland or significant wildlife habitat. "Activity" includes dredging, bulldozing, removing or displacing soil or vegetation, as well as the construction, repair or alternation of any permanent structure.[57] Thus the NRPA provides the fundamental statutory protection for Maine's wetlands, estuaries and other areas of environmental significance. Rules and regulations promulgated by the MEPA and other state agencies provide specific permitting requirements for activities proposed in significant areas.[58]

Maine's application to administer the National Pollutant Discharge Elimination System Program of the Federal Clean Water Act was approved by the EPA on January 12, 2001. Pursuant to the Waste Discharge Permitting Program a license

[55] http://www.maine.gov/dep/air/toxics/mercury.htm
[56] The MDEP is the permitting authority within the organized territory of the State of Maine. Permits for activities in the unorganized territories, i.e. land not in organized municipalities or townships, are obtained from Maine's Land Use Regulation Commission ("LURC").
[57] 39 M.R.S.A. § 408-C
[58] http://www.maine.gov/dep/blwq/docstand/nrpapage.htm#stat

must be obtained from MDEP for the point source discharge of pollutants to a stream, river, or lake of the state, or to the ocean.[59]

Invasive Species

In 2001 Maine's Legislature adopted **An Act to Prevent Infestation of Invasive Aquatic Plants and to Control Other Invasive Species**.[60] The Act provided for the establishment of an interagency task force to study the risks and potential responses of invasive species infestation. The resulting Invasive Aquatic Species Program Report was released in 2002. The task force recommendations included the designation of MDEP and the Maine Department of Inland Fisheries to jointly head an intergovernmental effort to educate the public on the existence and threats posed by invasive species, the ways to prevent their introduction and spread, and put in place a largely-volunteer monitoring effort to track the progression of invasive species in the land and coastal regions of the state. Strategies for interagency coordination, monitoring plans, rapid identification and eradication, and other measures for invasive species control are set forth the report (Interangency Task Force 2002).[61]

Coastal Zoning

Municipal zoning ordinances along the coast must conform to certain minimum requirements determined by the MDEP.[62] Developments that qualify for MDEP-mandated requirements are those that may have a substantial impact upon the environment, including those that occupy more than 20 acres, oil and terminal facilities, and other large structures and subdivisions. Also subject to MDEP permitting requirements are projects in shoreland areas subject to zoning and land use controls. Shoreland areas include those areas within 250 feet of the normal high-water line of any great pond, river or saltwater body, and within 250 feet of the upland edge of a coastal wetland.[63]

Department of Marine Resources

The purpose of the Maine DMR, as set forth in its enabling legislation, is to conserve and develop marine and estuarine resources; to conduct and sponsor scientific research; to promote and develop the Maine coastal fishing industries; to advise and cooperate with local, state and federal officials concerning activities in coastal waters; and to implement, administer and enforce the laws and regulations necessary for these enumerated purposes, as well as the exercise of all authority conferred by the Act.[64] In the exercise of its functions, the Department

[59] 38 M.R.S.A. § 413
[60] 12 M.R.S.A. §§ 7791, *et seq*.
[61] Invasive species have also been a focus of the Casco Bay Estuary Partnership and other National Estuary Programs within the Gulf of Maine. A forum sponsored by the CBEP was held in November, 2004 and the threat of marine invasive species has been added to the list of priorities for the CBEP and other programs. http://www.cascobay.usm.maine.edu/habitat.html#Habitat%20Protection
[62] 38 M.R.S.A. § 438-A
[63] 38 M.R.S.A. § 435
[64] 12 M.R.S.A. § 6021;

is empowered to adopt and enforce fisheries management plans (within the three mile territorial limit) as well as to adopt emergency measures for resource protection when confronted with unusual damage or imminent depletion. It also has jurisdiction to manage and regulate the inshore recreational fishing and aquaculture sectors. Finally, DMR has policy and regulatory responsibilities to prevent the introduction and spread of unwanted marine organisms into Maine waters.[65]

2.3.3 New Hampshire

Department of Environmental Services

The vast majority of responsibility for statewide environmental policy, regulation and enforcement in New Hampshire has been consolidated within the jurisdiction of the Department of Environmental Services ("DES") since 1987.[66] Its duties include water quality and supply, shoreland development, recreation, ecological balance, air quality and monitoring, and municipal and industrial waste management. These functions are carried out through the department's three divisions: Air Resources, Waste Management, and Water. A Senior Leadership Team comprised of the three division directors and two commissioners coordinate policy making and implementation for the department. In addition, a several commissions have been created by statute to advise the departmental directors on matters related to their jurisdiction and to hear appeals of final agency administrative decisions. These include the Air Resources Council, Water Resources Council, Water Council, Waste Management Council, Water Council, Wetlands Council, and Well Board. The mission of the department is "…to help sustain a high quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire."[67]

Coastal Zone Management

New Hampshire's coastal zone is comprised of the 17 municipal communities that border on the coast of New Hampshire or its tidal bays, estuaries and rivers. The New Hampshire Coastal Program ("NHCP") received federal approval under the CZMA in stages, with approval for the current NHCP obtained from the federal ORCM in 2004. The New Hampshire Department of Environment Services ("DES") has administered the NHCP and federal consistency reviews through the NHCP since 2004 (NHDES 2005). The mission of the New Hampshire Coastal Program includes a reference to intergenerational equity by declaring that NHCP seeks to "balance the preservation of natural resources of the coast with the social and economic needs of this and succeeding generations." To accomplish this mission, the Coastal Program pursues goals that include the prevention and abatement of coastal pollution, fostering community stewardship and awareness of coastal resources, and protection and restoration of coastal natural resources.

[65] http://www.cascobay.usm.maine.edu/invasilaw.html
[66] RSA 21-O (1987)
[67] http://des.state.nh.us/alook.htm; Additional details about CELCP set forth in Table A, *infra.*

The NHCP is active in other aspects of coastal land and habitat protection through its participation in NOAA's Coastal and Estuarine Land Conservation Program ("CELCP"). NHCP has contracted with The Nature Conservancy to develop a draft Coastal and Estuarine Land Conservation Plan (CELCP). The CELCP will assess and prioritize conservation needs in the Great Bay Watershed.[68] The NHCP is also attempting to qualify for funding to help restore coastal wetlands through the CZMA's Enhancement Program.[69] The New Hampshire Estuaries Project, a program funded by the EPA's National Estuary Program and administered by the University of New Hampshire, plays a vital role in research and planning for the state's coastal estuaries, including Great Bay and Little Bay (NHEP 2003).

Air Quality

The New Hampshire Department of Environmental Services, Air Resources Division, with guidance from the New Hampshire Air Resources Council, seeks to promote cost-effective, sensible strategies and control measures to address complex and inter-related air quality issues. The issues addressed by the Air Resources Division include ground-level ozone, particulate matter, regional haze (visibility), mercury emissions, increasing concentrations of greenhouse gases, acid deposition, and air toxics. Like the other New England states, New Hampshire recognizes that its direct impact is limited since many problems that the states in the Northeast U.S. can only be solved on a regional or national basis. The express considerations set forth for the Air Resources Division include guidance that Actions should be supported by the most recent scientific and health effects data available, while at the same time recognizing that new information will emerge in the future. Many ongoing state, (e.g., NH Comparative Risk Project), regional and national research efforts will provide better scientific data and improved understanding of ways to achieve multiple health and environmental benefits at lower cost. Further, the importance of public education and outreach activities is emphasized "…because they transcend all programs and because the pollution contributions of individual citizen's activities represent an increasing share of air pollution emissions." The DES also recognizes that alternative approaches to the "command and control" approach to regulation are needed to face current issues and to develop solutions that provide better environmental and public health outcomes faster and more cost-effectively.[70] New Hampshire DES has also promulgated rules that recognize the link between mercury emissions and mercury-tainted fish consumption and has joined with Maine, Massachusetts and Canadian Maritime Provinces Maine to participate in the 1998 New England Governors and Eastern Canadian Premiers Mercury Action Plan. The DES has also implemented a statewide New Hampshire Mercury Reduction Strategy to help reduce more localized mercury releases.[71]

[68] http://www.des.state.nh.us/Coastal/CoastalEstuarine.html; See also Table A, *infra*.
[69] CZMA § 309; http://www.des.state.nh.us/Coastal/Restoration/
[70] http://www.des.state.nh.us/airdiv.htm
[71] http://www.des.state.nh.us/nhppp/intro20.pdf

Water Quality

The Water Division of DES, with guidance from the Water Council, the Water Resources Council and the Wetlands Council, is responsible for the variety of programs that draft and implement water quality and waste water regulations, including Safe Drinking Water, wetlands, coastal water issues, groundwater, safe beaches and other programs.[72] The mission of the Water Division is "…To ensure that New Hampshire's lakes and ponds, rivers and streams, coastal waters, groundwater and wetlands are clean and support healthy ecosystems, provide habitats for a diversity of plant and animal life, and support appropriate uses." Water quality standards under the CWA are used to protect the state's surface waters. Accordingly, New Hampshire designates uses for water bodies, such as fishing or swimming; establishes numerical or narrative criteria to protect the designated uses; and an establishes policies intended to maintain water quality that exceeds the criteria.[73] NHDES is also working on completing its surface water quality surveys in accordance with the Clean Water Act, including a TMDL inventory (or "303d list").[74] New Hampshire's permitting requirements for the discharge of pollutants into surface and ground water are set forth in its Water Pollution and Waste Water legislation.[75]

The management and protection of New Hampshire's rivers are subject to the provisions of the Rivers Management and Protection Act.[76] The act established the River Management and Protection Program ("RMPP") and is administered by the NHDES. Any interested individual or group may nominate a river for inclusion under the RMPP based upon the river's values and outstanding natural or cultural characteristics. If the nomination is accepted the river is deemed a "designated river" by the DES Commissioner the legislature may approve the designation if it finds sufficient local support and important river values. The designation is final upon signature of the governor. Once a river has been designated for protection a management plan must be developed designed to protect the river for future generations. Any such plan is developed and implemented by a volunteer local river advisory committee. Plans generally identify goals and propose actions necessary to protect the designated river. NHDES assists with the development and implementation of the plan and enforces regulations governing quality and quantity of flow in the protected river segments.[77]

Invasive Species

The New Hampshire DES Exotic Species Program coordinates activities associated with the control and management of exotic aquatic plants; as well as

[72] http://www.des.state.nh.us/waterdiv.htm
[73] R.S.A. § 485-A ; http://www.gencourt.state.nh.us/rsa/html/L/485-A/485-A-8.htm
[74] http://www.des.state.nh.us/wmb/swqa/2004/default.asp?go=summary
[75] R.S.A. § 485 *et seq*.
[76] R.S.A. § 483
[77] See generally: http://www.des.state.nh.us/rivers/

activities associated with the implementation of education programs and volunteer plant monitoring programs.

New Hampshire Office of Energy and Planning

The New Hampshire Office of Energy and Planning plays a role in planning, land protection and municipal assistance in New Hampshire. Through 1993 the Land Conservation Investment Program acquired over 100,000 acres of land in New Hampshire in partnership with the private Trust for New Hampshire Land. Since the end of its acquisition phase in 1993, the Conservation Land Stewardship Program has been responsible for the monitoring and protection of state-acquired land.[78]

3.0 An Analysis of the Consistency of U.S. Federal and State Law with the Goals and Priorities of the Gulf of Maine Council

Before any analysis or comparison of the current state and federal law pertinent to the management of the human activities that impact the Gulf of Maine region it is critical to point out that there are no institutions or legislation that coordinate environmental regulation in the United States. This analysis will first examine the Mission and Guiding Principles of GOMC and compare them with typical elements of the current trend toward ecosystem-based management. It will then look at the policies and strategies adopted by the GOMC and briefly survey U.S. federal and state laws pertinent to the Gulf of Maine region. Finally it will briefly discuss and identify likely state and federal priorities for the period 2006 – 2011.

3.1 Ecosystem-Based Management and the Goals and Priorities of the Gulf of Maine Council

This report relies upon the statements and definitions set forth in the GOMC's *Action Plan 2001 – 2006* (GOMC 2001). The Mission articulated by the GOMC is to "…maintain and enhance environmental quality in the Gulf of Maine and to allow for sustainable resource use by existing and future generations." The Guiding Principles as set forth by the GOMC in the Action Plan are:

> **Guiding Principles**
> These principles help guide the Council and participating agencies in their decisions involving the Gulf of Maine ecosystem. Each principle is congruent with other international protocols, as well as state, provincial and national legislation in Canada and the United States.
>
> 1. Ecologically Sustainable Development

[78] RSA 162-C:6; http://nh.gov/oep/programs/CLSP/index.htm

> The Council seeks to meet the region's current social, cultural and environmental needs without compromising the needs of future generations. Working in partnership with others, it strives to sustain ecological processes and enhance the region's quality of life.
>
> 2. Ecosystem-based Planning and Management
>
> The Council supports collaborative management that integrates economic and ecological values and objectives, emphasizing natural rather than political boundaries.
>
> 3. Environmental Protection through Precaution
>
> The Council supports conservation of the coastal and marine environment, and urges its members to proceed with caution when scientific information is incomplete to avoid environmental degradation.
>
> 4. Public Information and Participation
>
> The Council is committed to a participatory process that informs and engages the public in setting priorities, forming policies and pursuing efforts to conserve the Gulf's environment (GOMC 2001)

While the GOMC Mission and Guiding Principles fail to define the meaning of "ecosystem-based management" ("EBM"), their language closely parallels the definition of EBM recently drafted by COMPASS as set forth below:

> Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors. Specifically, ecosystem-based management:
>
> • emphasizes the protection of ecosystem structure, functioning, and key processes;
>
> • is place-based in focusing on a specific ecosystem and the range of activities affecting it;
>
> • explicitly accounts for the interconnectedness within systems, recognizing the importance of interactions between many target species or key services and other non-target species;
>
> • acknowledges interconnectedness among systems, such as between air, land and sea; and
>
> • integrates ecological, social, economic, and institutional perspectives, recognizing their strong interdependences (COMPASS 2005).

The Goals and Guiding Principles of the GOMC are largely consistent with the COMPASS definition. The GOMC Mission Statement incorporates the need for sustainable resource use and appropriately equates "sustainable use" with a nod to intergenerational equity and the need to sustain resources for use by future generations. The GOMC Guiding Principles also reflect consistency with the COMPASS definition by calling for the use of partnerships, collaborative management and the consideration of integrated economic and ecological values and objectives without regard to political boundaries. The GOMC actually goes beyond the COMPASS definition by calling for the use of a precautionary approach where scientific information is incomplete and by emphasizing the need for a transparent and participatory process that informs and engages the public in regulatory efforts to conserve the Gulf's environments. The precautionary approach and the importance of strong public participation are hallmarks of ecosystem-based management. Their inclusion by the GOMC is laudable while their apparent omission from the COMPASS definition is surprising.

3.2 GOMC Goals and U.S. Federal/State Laws

The goals and objectives of the GOMC are largely consistent with an ecosystem-based approach to management of the Gulf's valuable natural resources. Neither the GOMC, however, nor any other single institution has the authority to exercise the jurisdiction necessary to coordinate, implement or enforce ecosystem-based management over the activities that impact the Gulf's ecosystem. Indeed the health of the Gulf of Maine ecosystem is dependent upon the decisions and policies rendered by a dizzying array of U.S. federal and state laws and governing institutions as well as the equivalent array on the Canadian side of the Gulf. The purpose of this section is to list the goals and objectives of the GOMC as identified in the Action Plan 2001-2006. Selected federal and state statutes[79] relevant to those goals will then be discussed and their consistency or divergence from the goals will be briefly highlighted.

Goal 1: Protect and Restore Coastal and Marine Habitats
Objectives
a. Increase awareness and improve management of regionally significant habitats

The federal government can be called upon through several statutes to increase awareness and improve management of regionally significant coastal and marine areas. NOAA administers the **National Marine Sanctuary Program** and authorized to create national marine sanctuaries to protect natural and cultural resources. The Stellwagen National Marine Sanctuary is an example of a

[79] The impressive number of agencies, programs and statutes with direct and indirect impact on the Gulf of Maine make it impossible to list let alone evaluate every one. It is hoped that this document will provide a foundation for future research and revision and that the GOMC will continue to compile a list of public prescriptions and private efforts on both sides of the international border that provide input into the conservation of the Gulf of Maine ecosystem.

protected area in the Gulf of Maine authorized through the program. NOAA also supports the **Coastal Services Center** in order to support the environmental, social and well being of the coast by linking people, information, and technology.[80] The EPA's **National Estuary Program** ("NEP") was created to improve the quality of estuaries of national importance. It accomplishes this goal by promoting the restoration of estuary habitat, the development of a national estuary habitat restoration strategy, and providing the funds for the establishment, research and funding for NEP-designated estuaries. The U.S. Army Corps of Engineers is also authorized to promote the restoration of estuary habitat. Coastal beaches may also be regionally significant habitats and the EPA's **Beaches Environmental Assessment and Coastal Health Act of 2000** ("BEACH") mandates that states submit water quality criteria and standards and adopt plans to monitor and control for designated pathogens. Funding for the establishment of the plan and for monitoring and implementation are available through the Act. The Gulf of Maine is also one of the critical habitats subject to the **US Fish and Wildlife Service's Coastal Program**. The purpose of the Coastal Program is to conserve fish and wildlife and their habitats in order to support healthy coastal ecosystems. The USFWS also administers the **National Wildlife Refuge Administration Act** which consolidates the various categories of lands administered by the Department of the Interior into a single National Wildlife Refuge System. As a result, numerous parcels of land surrounding the Gulf of Maine are USFWS wildlife refuges subject to comprehensive conservation plan processes and protection. The USFWS also helps administer the **Coastal Barrier Resource Act** which identifies undeveloped coastal barrier lands and associated marine or aquatic areas that serve as barriers protecting coasts along the Atlantic, Gulf of Mexico and the Great Lakes and prohibits federal expenditures or subsidies that tend to encourage development of such areas. Finally, the USDA administers a variety of programs including the **Wetlands Reserve Program**, the **Environmental Quality Incentives Program** and the **Conservation Security Program** that increase habitat awareness and offer incentives for farmers to reduce nonpoint source pollution and conserve land retired from agriculture.

At the state level, Maine, New Hampshire and Massachusetts have benefited from the EPA's Estuary Program. States also implement land acquisition programs. In Maine the MSPO's Land for Maine's Future program, uses public funds to acquire land to set aside for conservation and coastal protection. Although the acquisition of New Hampshire's state program for land procurement ended in 1993, the partnership between the NHCP and The Nature Conservancy to develop a draft Coastal and Estuarine Land Conservation Plan (CELCP) is slated to assess and prioritize conservation needs in the Great Bay Watershed. The New Hampshire Estuaries Project, a program funded by the EPA's National Estuary Program and administered by the University of New Hampshire, plays a vital role in research and planning for the state's coastal estuaries, including Great Bay and Little Bay. All three states have statewide plans designed to enforce minimum

[80] http://www.csc.noaa.gov/text/gen.html

standards for coastal development. In Massachusetts, voters approved additional funding for land protection activities in 2002 (Pesch and Wells 2004).

b. Increase habitat protection

1. Protect an additional 5,000 acres of habitat within coastal communities

Much of the discussion immediately above applies to the goal of increasing habitat protection. At the federal level one program within the National Marine Fisheries Service that deserves mention is the **Essential Fish Habitat** ("EFH") protection provision of the **Magnuson-Stevens Fishery Conservation and Management Act** requiring that EFH be identified and protected. On its face the provision seems to foster the protection of marine habitat. Protection of critical habit under the ESA extends to federal or federally-authorized activities. *See* 16 U.S.C. Section 1536(a)(2). Thus critical habitat designations can impact private activities that require federal permits. EFH regulations, however, require only that EFH be identified and that the adverse impacts *caused by fishing* be minimized *to the extent practicable.* In addition, any regulation or habitat protection afforded by the provisions of Magnuson-Stevens extends only to commercial species. Since the functioning of a sustainable, resilient and diverse marine ecosystem turns on more than just those species for which an economic market exists, it is fair to believe that serious gaps exist in the management of the harvesting of marine organisms, the threats posed by by-catch, and the harm sustained by non-commercial but environmentally key species. Further, other adverse impacts, including water and air pollution permitted by the EPA under the CWA or CAA which cause harm to fish or other ecosystem function cannot be restrained under the EFH provisions. The time may be ripe for the GOMC to discuss options for cooperation and coordination for efforts to fill the existing regulatory gaps.

One other possible avenue for habitat protection has been tried in other regions of the United States: The purchasing of offshore leases from states in order to protect significant marine habitats. Submerged lands available for lease pertinent to the Gulf of Maine include a variety of ecosystems such as kelp forests, marshes, seagrass meadows, clam and scallop beds and sponge and deep coral gardens. Since all coastal states allow leasing in some portion of their waters, it is conceivable that private and public partnerships could be encouraged to use this tool to help protect significant submerged habitat (Beck, Marsh et al. 2004).

c. Increase habitat restoration

1. Restore 3,000 acres of coastal and marine habitats by 2006, maintaining the rate of restoration achieved between 1996 and 2001.

The **Estuary Restoration Act** ("ERA") promotes the restoration of estuary habitat and includes Maine, New Hampshire, and Massachusetts. The goal is pursued through the development of a National Estuary Habitat Restoration

Strategy for creating and maintaining effective partnerships within the Federal government and with the private sector, providing Federal assistance for and promotes efficient financing of estuary habitat restoration projects; and developing and enhancing monitoring, data sharing, and research capabilities. The NHCP is also attempting to qualify for funding to help restore coastal wetlands through the CZMA's Enhancement Program. The USFWS Gulf of Maine Program has also played a key role providing and coordinating technical and financial support from many conservation partners. The Program has played a substantial role by restoring nesting bird habitats, identifying and funding salt marsh and grassland restoration work, restoring migratory fish passage at 56 sites, conducting riparian projects to reduce nonpoint source pollution, restoring native grasslands and other projects in the Gulf of Maine region.

d. Increase awareness and improve management of aquatic nuisance species

At the federal level, The **National Invasive Species Act** ("NISA") was passed in 1996 creating the Aquatic Nuisance Species (ANS) Task Force to direct ANS activities annually. The Task Force is co-chaired by the U.S. Fish and Wildlife Service (Service) and the National Oceanic and Atmospheric Administration. Other members include the National Marine Fisheries Service, Environmental Protection Agency, Department of Agriculture, the U.S. Coast Guard, the U.S. State Department, and the Army Corps of Engineers. NISA furthered ANS activities by calling for ballast water regulations, the development of State management plans and regional panels to combat the spread of ANS, and additional ANS research. Guidelines issued to prevent the introduction and spread of nonindigenous species in waters of the United States by ballast water operations and other operations of vessels equipped with ballast water tanks are voluntary. As written, the Act currently seems to call mainly for monitoring and public/state awareness and fails to mandate any affirmative measures or standards to address the problem.

At the state level, Maine's adoption of **An Act to Prevent Infestation of Invasive Aquatic Plants and to Control Other Invasive Species** establishes an interagency task force to study the risks and potential responses of invasive species infestation in both the fresh and salt water environment. In 2002 the task force recommendations included the designation of MDEP and the Maine Department of Inland Fisheries to jointly head an intergovernmental effort to educate the public on the existence and threats posed by invasive species, the ways to prevent their introduction and spread, and put in place a largely-volunteer monitoring effort to track the progression of invasive species in the land and coastal regions of the state. Strategies for interagency coordination, monitoring plans, rapid identification and eradication, and other measures for invasive species control are also addressed by the task force report. New Hampshire's legislative record fails to reflect any emphasis on invasive species in the marine environment. The New Hampshire DES Exotic Species Program coordinates activities associated with the control and management of exotic aquatic plants; as

well as activities associated with the implementation of education programs and volunteer plant monitoring programs – but apparently only with respect to terrestrial and aquatic species. In Massachusetts, the focus is similarly on aquatic and terrestrial plants. The Massachusetts Invasive Plant Advisory Group (MIPAG) was established by the Massachusetts Executive Office of Environmental Affairs (EOEA) and charged with advising the Commonwealth on which plants are invasive and what steps the state should take to manage these species. A statewide collaborative of organizations, agencies and professionals concerned with the conservation of Massachusetts' natural landscape, has developed a master list of non-native plants that it recognizes as "Invasive, Likely Invasive, or Potentially Invasive" in the state, and has drafted a strategic plan for addressing the invasive plant issue in the Commonwealth.[81]

e. Enhance citizen stewardship

The goals set forth by the GOMC recognize that a critical characteristic of an effective ecosystem approach to governance is the meaningful participation and input of a broad segment of the regulated population in decision making processes. Public understanding of the issues is essential as is significant consensus on natural resource management decisions. Timely access by the public to reliable information is important. Strong, direct national governmental control of living marine resources, on the other hand, may create a form of top-down management that makes enforcement of regulations and collection of reliable data difficult because of the resentment and resistance in the regulated community (Pauly and Maclean 2003). Decisions concerning the use and regulation of natural resources should be made only after exhaustive review of the viewpoints of all segments of the public. Strong stakeholder participation contributes to credible, accepted rules that identify and assign responsibilities between resource users (Costanza, Andrade et al. 1998). In the Gulf region and other study areas the extent and mechanisms for stakeholder involvement, and their impact, in significant ecosystem-based management decisions must be identified and utilized to the extent practical. There would certainly appear to be clear advantages to involving the public, NGO, regulatory agencies and regulated community in the development of the GOMC's 2006 – 2011 action plan.

Policy, and related enabling legislation, provides support for increasing citizen awareness and involvement. The **National Environmental Protection Act** remains a strong tool for citizen involvement and input into the environmental impacts of federal projects that may have significant impact on the environment at the federal government level. Statutory avenues for citizen stewardship also exist through the establishment and implementation of fishery management plans under **Magnuson-Stevens** and through the citizen participation and monitoring provisions included in the EPA's **National Estuary Program**. NEP estuary programs in Maine, Massachusetts and New Hampshire rely heavily on citizen volunteer monitoring and stewardship activities. In addition, the USDA's **Farm**

[81] http://nature.org/wherewework/northamerica/states/massachusetts/press/press1917.html

Security and Rural Investment Act of 2002 programs provide incentives for environmental conservation and citizen stewardship, including wetland protection through the **Wetlands Reserve Program** and other stewardship incentives through the **Conservation Security Program** and the **Environmental Quality Incentive Program**.

At the state level, New Hampshire, Maine and Massachusetts have all enacted programs that require citizen monitoring and participation. In New Hampshire the key divisions of the NHDES are overseen by boards comprised of citizen nominees. These include the Air Resources Council, Water Resources Council, Water Council, Waste Management Council, Water Council, and the Wetlands Council. In addition one of the goals of the NH Coastal Program is to foster community stewardship. In Maine, the Maine State Planning Office's Coastal Plan also seeks to promote community involvement and stewardship. The Maine Department of Marine Resources in-shore trawl survey and various shellfish management plans also promote citizen involvement and stewardship through collaborative management plans and monitoring of fish population changes. Finally, Massachusetts programs designed to increase citizen stewardship include the Office of Coastal Zone Management's Ocean Management Initiative. The Massachusetts Division of Marine Fisheries also includes citizens in tagging programs and other research activities.

Goal 2: Protect Human Health and Ecosystem Integrity
Objectives
a. Increase awareness and improve management of priority contaminants

Priority contaminants and other hazardous pollutants are largely governed by the federal **Clean Air Act** and **Clean Water Act**. The states in the region regulate acceptable levels of pollutant emissions through their NPDES programs and NAAQS attainment standards. With respect to air emissions, the states have adopted stricter mercury standards through local regulation and participation in the **New England Governors and Eastern Canadian Premiers Regional Mercury Action Plan of 1998**.

Perhaps the biggest potential disconnect between GOMC goals and regulatory reality, however, involves the degradation of coastal waters through the cumulative impacts of a variety of pollutants originating from sources both in close proximity to the coast and from far inland. In the GOMC's comprehensive report *Tides of Change Across the Gulf: An Environmental Report of the Gulf of Maine and Bay of Fundy,* the authors describe the environmental threats to the Gulf of Maine posed by increasing coastal development and the resulting in increasing nutrient loading (chiefly nitrogen, phosphorous and carbon) and the bioaccumulation of mercury (Pesch and Wells 2004). While EPA regulation of air effluents and point source discharges have resulted in a vast improvement of air and water quality over the last 30 years, the threats from non-point sources and

federal regulatory roll backs pose challenges to the environmental quality of the Gulf of Maine ecosystem.

Water pollution remains a threat to Gulf of Maine coastal waters (Chase, Jones et al. 2001; USGS 2001; Pesch and Wells 2004; USCOP 2004; GoMOOS 2005) . Coastal degradation from nutrient overloading is one concern in the Gulf of Maine and is largely a product of burgeoning coastal development. As more and more homes, roads and commercial and industrial facilities are built in the watershed, the increase of impervious surfaces causes additional runoff and greater input of untreated nutrients and pollutants into the ultimate receiving waters of the Gulf of Maine. One solution is for states to increase the pace of their compliance with the **TMDL** requirements mandated by section 303(d) of the **Clean Water Act**. Further, point-source regulations are subject to state-induced weakening when states reduce their use classifications and therefore permit a reduction in water quality standards. [82]

With respect to Clean Air Act enforcement, the withdrawal of the United States from the Kyoto Protocol does not send a positive message for the federal government's willingness to reduce its greenhouse gas emissions. On a more local level, however, states in the region have generally had success with mercury emission reductions. The sources of atmospheric mercury, however, are often located outside of the New England region beyond the jurisdiction of state governments in the Gulf of Maine region. The Conference of New England Governors and Eastern Canadian Premiers has also resolved to commit to short, medium, and long term greenhouse gas emission reductions through the NEC/ECP *Climate Change Action Plan 2001* (NEG/ECP 2001). At the federal level conservative and precautionary Clean Air Act NAAQS may be required to achieve real gains in regional mercury and greenhouse gas reductions. The recent trend, however, seems to be a loosening of federal Clean Air Act regulations. Less restrictive national standards may have the effect of increasing, or at least failing to reduce, greenhouse gas emissions and the amount of mercury that precipitates onto the Gulf of Maine watershed.[83] All in all, the threats described in the *Tides of Change* report may be exacerbated by weaker federal regulation unless countermeasures are taken to tighten local, state and regional efforts to prevent an increase of harmful pollutant discharges.[84]

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[82] Water quality standards rely upon two state-mandated elements: (1) use classifications, and (2) criteria that, if not exceeded, will protect the use designation. States, then, have the latitude to classify rivers and waterways within their borders to match their intended use. A river may be classified as one to be used for public drinking water supplies, recreational purposes, industrial, agricultural, to name a few. When states redesignate a stretch of river and downgrade its classification, for instance, the level of permissible discharges is increased and the total pollutants reaching the ultimate receiving water, e.g. the Gulf of Maine increase accordingly.

[83] Massachusetts, Maine and New Hampshire have all joined in law suits against the U.S. Environmental Protection Agency arguing that Clean Air Act regulatory changes threaten the health and environment in their states by increasing the amounts of pollutants that power plants and others are able to release into the air (Arsenault 2005).

[84] Resolution 28-8 of the 28th Annual Conference of the NEC/ECP notes that USEPA New Source Review air quality changes "abandon the fundamental principle that new sources of air pollution must be required

b. Identify reduction strategies for priority contaminants

See the discussion immediately above.

c. Enhance citizen stewardship

See the discussion under Goal 1 above.

Goal 3: Encourage Sustainable Maritime Activities
Objectives
a. Create and implement a marine research and monitoring strategy that responds to pressing management issues and supports regional economic development

Several monitoring programs and strategies are described in the GOMC's *Tides of Change* report and will not be further discussed here (Pesch and Wells 2004).

One marine research effort that bears mention is the development of the Integrated Ocean Observing System as called for in the recommendations set forth by the US Commission on Ocean Policy was (USCOP 2004). The report notes that the U.S. has made significant progress toward a strategic plan for the design of a Global Ocean Observing System. One national pilot project under the IOOS is the Gulf of Maine Ocean Observing System ("GoMOOS"). GoMOOS is a non-profit corporation sponsored by the Office of Naval Research to provide integrated, remotely-sensed and *in situ* information about the Gulf of Maine and related ecosystems on an hourly basis for by researchers, managers, military experts, industry, educators and others seeking to understand the cold water environment, to manage ocean and littoral resources, and to develop commercial uses of marine resources, data and information resources (GoMOOS 2005).

b. Develop and implement a nature-based tourism strategy that sustains the environment and the well-being of local people

The development of incentives for nature-based tourism would largely be a function of the coastal states and their respective tourism office. One example of a focused effort to develop an ecotourism strategy is the Maine Office of Tourism's Maine Tourism Commission Natural Resource Committee to examine tourist activities throughout the state on Maine's natural resources. It is intended to develop strategies for ensuring the sustainable use of these resources by citizens and visitors who wish to take advantage of the available range of recreational opportunities. Finally, it will develop and recommend programs that

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to minimize their emissions using the best control technologies available" and "…do not provide adequate protection for the public health of the citizens of the new England States and Eastern Canadian Provinces…"
NEG/ECP (2003). Resolution Concerning Equitable Air Pollution Strategies, NEG/ECP. **Resolution 28-8**.

will capitalize on the unique natural attributes of Maine's coastal and inland landscapes and ecosystems.[85]

4.0 The Road Ahead: Some Thoughts on Future Priorities and Options

Attempts at the regulation of human activities that impact the environment are relatively recent phenomena. With rare exception, regulation has evolved in a sector-by-sector manner as conflicts and related problems emerged. Fishery user conflicts gave rise to traditional fisheries management. Coastal navigation in increasingly congested coastal waters, offshore oil and gas exploration, and other resource user issues are handled by separate and evolving regulations by an increasing abundance of regulatory agencies. Regulatory jurisdiction varies with location. Inland activities that impact coastal and ocean resources including agriculture, forestry, river diversions and damming, water (point and non-point) pollution, air pollution, mining, and wetland alteration to name a few are regulated by a variety of federal, state and local political jurisdictions. On the ocean side of the land/water interface, the level of regulatory jurisdiction is entirely dependent upon location. Local government generally controls shore land development and use. States or provinces typically have jurisdiction over the territorial seas extending from 3 to 12 or more nautical miles out from the shore. Finally, national governments assert control over the Exclusive Economic Zone (EEZ) extending 200 miles out to sea (Cicin-Sain and Knecht 2000, 16).

The common thread to the existing piecemeal regulatory measures, however, is the will and desire to limit human activities in order to conserve and protect the environment. This report has set forth many of the federal and state agencies, laws, and programs that exist for the purpose of environmental regulation and protection in the Gulf of Maine region of the United States. All were enacted with significant public input into the political process and all share a common intention to attempt to protect some aspect of the environment from human-caused degradation. Agencies and governmental institutions, often in partnership with private and non-profit organizations and citizens, have the individual legislative authority to carry out statutory mandates and enforce existing laws for the protection of coastal and marine ecosystems within their jurisdiction. It is becoming increasing evident, however, that the cumulative results of these fragmented efforts may not prove sufficient to protect the Gulf of Maine ecosystem. The extent to which these individual institutional mandates are consistent with the priorities of the Gulf of Maine Council, and what role the Gulf of Maine Council might play in an evolving environmental regulatory scheme over the next five years, are the subjects of the following section.

4.1 GOMC 2006 – 2011 Priorities

[85] http://www.econdevmaine.com/resources/tourism/natural_resources.pdf

There is no mystery to the principle threats posed to the Gulf of Maine ecosystem. Human activity has profoundly changed the Gulf of Maine marine communities in five major ways:

1. Overextraction of marine organisms
2. Invasions of nonindigenous (exotic) species
3. Chemical pollution, eutrophication, and related consequences such as toxic phytoplankton blooms
4. Alteration of physical habitats
5. Global climate change (Steneck 2001)

It would make sense that the priorities for the Gulf of Maine Council, and for environmental governance in the Gulf of Maine in general, to adjust priorities to adequately address these threats as summarized above. While the current GOMC Principles, Goals and Strategies address the threats posed by pollution and habitat alteration, they appear silent as to those posed by climate change, invasive species and resource overextraction. This may be because other governmental units on either side of the Hague Line are assigned to address these threats. Even where this is true, it might be wise for the GOMC to at minimum address these additional threats in its fourth five year plan.

One key problem, of course, has already been noted by the GOMC's *Tides of Change* report in its discussion about the future of land use regulation:

> The situation in the Gulf of Maine is further complicated because the region is controlled by hundreds of municipalities, dozens of counties and metropolitan regions in two countries. To say that authority is fragmented understates the enormity of the challenge to creating a coherent …policy. The difficulty inherent in collecting Gulfwide data for this report, alone, is an illustration of the complexity of the task without taking into consideration differences in land use law, culture, and traditional use (Pesch and Wells 2004).

Add to the quote above the additional jurisdictional hurdles posed by three states and two provinces and the scale of the complexity is drawn into greater focus.

Thus the Gulf of Maine Council is at a major crossroads with the drafting of its 2006 – 2011 Action Plan. A primary question that might be considered for the Council is, given the daunting plethora of federal, state, provincial and municipal laws, what role should the Council play in governance (i.e. law and policy) in the next five years?

Few would argue with the basic premise that ecosystem-based management requires some measure of overall coordination. Since none formally exists for the Gulf of Maine there needs to be some adjustment of power and authority in order

to bring some coherence to the environmental management regime in the Gulf of Maine. Any real movement toward coordination would set an example for other regions of the world where few cross-border EBM models exist. Options, in other words, should be thoughtfully explored and discussed.

4.2 The Great Lakes Water Quality Agreement Experience

While a wholesale paradigm switch would be tricky, it is noteworthy that the United States has already gone on record internationally as being supportive of key components of ecosystem-based management, including adoption of a precautionary approach when confronted with uncertainty in issues related to marine resource management (F.A.O. 1995; U.N. 1996). Thus the United States has shown the will to adopt an ecosystem approach; the question remains how such an approach might be implemented with respect to the resources of the coastal oceans of the United States in general and the Gulf of Maine in particular.

The nuts and bolts of such a change may not be so drastic. Indeed the statutory underpinnings may already be in place on both sides of the border. What may be required is simply a commitment to an ecosystem approach followed by the negotiation and implementation of appropriate Memoranda of Understanding and Joint Agreements between responsible state and federal agencies and, where necessary, consistent provisions could be negotiated with Canadian officials at all levels. Capacity-building and cooperation with local and coastal community governments should also be part of any approach. There is a precedent for effective, cooperative, bilateral ecosystem-based management of water quality and fisheries management issues.

The model for the restoration of the Great Lakes basin is embodied in the regime and processes created and implemented under the Great Lakes Water Quality Agreements (1987) and the Great Lakes Fishery Act of 1956 (1956). While the Great Lakes governance regime is far from perfect and daunting issues persist, lessons can be learned from this binational arrangement. One commentator has described the environmental management regime in the Great Lakes as "…one of the most radical and comprehensive experiments in ecosystem management yet articulated for transboundary water resource management" (Becker 1993). The EPA has declared that the efforts undertaken pursuant to the GLWQA "have resulted in the greatest example of successful environmental restoration in the world. Indeed, the Great Lakes have served as the world's laboratory for environmental protection and restoration" (USEPA 2002).

The ecosystem approach taken by the U.S. and Canada under these agreements to address, *inter alia*, the Great Lakes fisheries crisis and extreme environmental degradation of the 1960's and 1970's may provide a blue print for cooperative and ecosystem-based management efforts in other geographically-similar regions, especially those regions where Canada and the United States share significant marine resources. Although a thorough analysis of the GLWQA/GLFC regime is

beyond the scope of these comments, a few key components that have proven successful in the Great Lakes will be discussed and put forward as a possible model for bioregional ecosystem-based environmental governance.

Much of the success of the GLWQA/GLFC regime may be attributed to the adoption of an ecosystem-based approach to management. With an ecosystem approach, the scope of the regime expanded from the shoreline and estuaries of the Great Lakes to the entire drainage basin, an area more than twice the size of the lakes themselves. Thus authority extends to the entire range of human activities within the watershed, including jurisdiction over air emissions and groundwater. Industries and development along rivers feeding into the Great Lakes were brought within the fold. Along with its ecosystem approach, the GLWQA sets forth another ambitious priority: the virtual elimination of persistent toxic substances. The goal of the regime is for a "zero discharge" of toxic contaminants. While the philosophy of zero discharge is derived from domestic law, the IJC has taken the issue one step further by recommending steps that give strong guidance and policy direction toward the goal of virtual elimination of persistent toxic substances. These recommendations include a call for the adoption of a *reverse onus* requirement. Under this concept, "when any approval is sought for the manufacture, use or discharge of any substance which will or may enter the environment, the applicant must prove, as a general rule, that the substance is not harmful to the environment" (Valiante 1997). Further, the regime has recommended a "sunset" approach to the most toxic chemical families. Interestingly, the United States is on record as supporting at least the intent of these proposals (USEPA 2002).

In addition to the ambitious goals related to land-based activities impacting the Great Lakes ecosystem, one other key component of the Great Lakes experience needs to be highlighted. As the Ecosystem Principles Advisory Panel has pointed out, public participation is a key element of an ecosystem approach to management (EPAP 1999). Commentators examining the success of the Great Lakes ecosystem approach have drawn attention to the vitality and relevance of the broad participation of nongovernmental interests, including NGO's, environmental groups, industry and citizens in the Great Lakes experience. In essence, the GLWQA is a model of grass roots involvement. The IJC has recognized that no initiative may proceed without widespread public understanding and acceptance of the goals and strategies employed to reach them. Citizen involvement is elicited through comprehensive public information programs, round tables (where citizens are invited to join groups of 18 – 20 persons to discuss specific Agreement related topics), direct participation (including qualified citizens on boards and expert committees) and environmental education (educational programs and curricula have been designed for use in schools promoting sustainable ecosystem management, teacher training is urged and facilitated). Further, technical meetings involving remediation efforts are often preceded by pre-meeting educational sessions, where pertinent agency staff

and scientists work with the public to familiarize them with the technical reports and issues that are pending (Becker 1993).

4.3 Remedial Action Plans

If one accepts the premise that the complex long term threats facing the Gulf of Maine ecosystem are not amenable to resolution through the cumulative efforts of independent departments and agencies, there may be a way for the GOMC to address problems in a more focused multidisciplinary manner through the use of Remedial Action Plans ("RAPs") Again referring to the provisions of the Great Lakes Water Quality Agreement, Annex 2 defines RAPs as plans designed to restore geographical regions that have sustained a loss or impairment of beneficial use. The impairment of beneficial use may be defined in many ways, including the degradation of fish populations, restrictions on fish and other wildlife consumption, fish tumors and bird or animal deformities and reproduction problems, degradation of benthos, eutrophication, beach closings, added costs to agriculture or industry, degradation of phytoplankton and zooplankton populations and a variety of other indicators.

RAPs can provide for a comprehensive assessment of regional problems involving extensive public participation. In addition, agency officials from both sides of the border could be called upon to provide personnel to use a multidisciplinary and integrative approach to ocean and coastal issues that put aside conventional boundaries between disciplines. The coastal waters and adjacent land areas would be considered as one social and ecological system. Specialists in a variety of disciplines, including law, economics, public administration and others could be detailed to play a role in policy formation. The information gleaned from this participatory process could then be distilled into proposed remedial actions and implementation steps designed to restore beneficial use to the region or problem. While this approach requires aggressive public, private and agency cooperation and funding, the results could yield an environmental and economic benefit far more beneficial than simply an increase in commercial fish populations.

4.4 Conclusion

In sum, ecosystem-based management in the Gulf of Maine region could be accomplished with a minimum of direct Congressional involvement. Existing agencies could be harmonized through common goals and policy, and implementation achieved through Joint Agreements, Memoranda of Understanding, and related devices. Watershed groups, fishermen, industry, agencies, academic institutions, NGOs and others could be woven into the process as has been demonstrated by the Great Lakes experiment. The possibility exists for the Gulf of Maine Council to take a more active role leading to significant change in attitude and direction accomplished with challenging though

comparatively painless administrative and jurisdictional coordination and planning.

References

(1956). Great Lakes Fishery Act of 1956. 16 U.S.C. §§ 931-939c.

(1987). Great Lakes Water Quality Agreement of 1978, U.S.-Can., 30 U.S.T.1384; Protocol to Amend the Great Lakes Water Quality Agreement of 1978, Nov. 18, 1987, Can.-U.S., 1987 Can. T.S. No. 32. 30 U.S.T. 1384.

Beatley, T., D.J. Brower et al. (1994). An Introduction to Coastal Zone Management. Washington, D.C., Island Press.

Beck, M. W., T. D. Marsh, et al. (2004). "New Tools for Marine Conservation: the Leasing and Ownership of Submerged Lands." Conservation Biology **18**(5): 1214 - 1223.

Becker, M. L. (1993). "The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks." N. Res. J. **33**: 235.

Cicin-Sain, B. and R. Knecht (1998). Integrated Coastal Management: Concepts and Practices. Washington, D.C., Island Press.

Chase, M. E., S. H. Jones, et al. (2001). "Gulfwatch: Monitoring Spatial and Temporal Patterns of Trace Metal and Organic Contaminants in the Gulf of Maine (1991-1997) with the Blue Mussel, *Mytilus edulis* L." Marine Pollution Bulletin **42**(6): 491-505.

COMPASS. (2005). "Science Consensus Statement on Marine Ecosystem-Based Management." Retrieved October 1, 2005, 2005, from http://compassonline.org/files/inline/EBM%20Consensus%20Statement_FINAL_July%2012_v12.pdf

Costanza, R., F. Andrade, et al. (1998). "Principles for sustainable governance of the oceans." Science **281**(5374): 198 - 199.

De Guise, S., S. Shaw, et al. (2001). "Consensus Statement: Atlantic Coast Contaminants Workshop 2000." Environmental Health Perspectives, Journal of the National Institute of Environmental Health Sciences **109**(12): 1301 - 1302.

EPA (2003). Direction for the Future: EPA Strategic Plan 2003 - 2008. EPA, EPA**:** 239.

EPAP (1999). Ecosystem-Based Fishery Management: A Report to Congress by the Ecosystem Principles Advisory Panel, Ecosystem Principles Advisory Panel, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

F.A.O. (1995a). Code of Conduct for Responsible Fisheries. Rome, Food and Agriculture Organization of the United Nations.

Field, J., D. Boesch, et al. (2001). Potential Consequences of Climate Variability and Change on Coastal Areas and Marine Resources. Marine Community Ecology. M. e. a. Bertness. Sunderland, MA, Sinauer Associates, Inc.**:** Chapter 16.

GARM (2005). Assessment of 19 Northeast groundfish stocks through 2004. 2005 Groundfish Assessment Review Meeting (2005 GARM) 15-19 August 20. Woods Hole, Massachusetts, Northeast Fisheries Science Center.

GLOBEC (1995). Global Ocean Ecosystems Dynamics and Climate Change: A Long Range Science Plan 1995 - 2000. Berkely, CA, Scientific Steering Committee Coordinating Office.
GOMC (2001). Gulf of Maine Council on the Marine Environment Action Plan 2001 – 2006. Gulf of Maine Council on the Marine Environment: 31
GOMCb (2005). About the Council: Mission and Principles, Gulf of Maine Council on the Marine Environment.
GoMOOS. (2005). "Gulf of Maine Ocean Observing System." Retrieved October 1, 2005, 2005, from http://www.gomoos.org/.
Hanna, S. S., H. Blough, et al. (2000). Fishing Grounds: Defining New Era for American Fisheries Management. Washington, D.C., Island Press.
Helvarg, D. (2001). Blue Frontier: Saving America's Living Seas. New York, NY, Henry Holt and Company.
Hildebrand, L. A., V. Pebbles, et al. (2002). "Cooperative ecosystem management across the Canada-US border: Approaches and experiences of transboundary programs in the Gulf of Maine, Great Lakes and Georgia Basin/Puget Sound." Ocean & Coastal Management **45**: 421 - 457.
Interagency Task Force (2002). State of Maine Action Plan for Managing Invasive Aquatic Species. I. T. F. o. I. A. P. a. N. Species, 74.
IPCC (1996). Climate Change 1995: Impacts, Adaptations, and Mitigation of Climate Change. Cambridge, UK, Cambridge University Press.
Jackson, J. B. C., M. Kirby, et al. (2001). "Historical Overfishing and the Recent Collapse of Coastal Ecosystems." Science **57**: 649 - 658.
Juda, L. (2003). "Changing National Approaches to Ocean Governance: The United States, Canada and Australia." Ocean Development and International Law **34**: 161 - 187.
Link, J. (2002). "Ecological Considerations in Fisheries Management: When Does It Matter?" Fisheries **27**(4): 10 - 15.
M.S.P.O. (2001). Maine Coastal Plan: Assessment and Strategy under Section 309 of the of the Coastal Zone Management Act, Maine State Planning Office. Submitted to the National Oceanic and Atmospheric Administration Office of Ocean and Coastal Resource Management.
MSPO (2002). Maine Guide to Federal Consistency Review. M. S. P. Office, Maine Coastal Program, Maine State Planning Office**:** 18.
Mangel, M., R. J. Hofman, et al. (1993). "Sustainability and ecological research." Ecol. Appl. **3**((4)): 573 - 575.
NEG/ECP (1998). Mercury Action Plan 1998. T. C. o. t. E. o. t. C. o. N. E. G. a. E. C. Premiers, NEG/ECP**:** 19.
NEG/ECP (2001). Climate Change Action Plan 2001. T. C. o. t. E. a. t. N. I. C. o. Energy, NEG/ECP**:** 21.
NEG/ECP (2003). Resolution Concerning Equitable Air Pollution Strategies, NEG/ECP. **Resolution 28-8**.
NHDES (2005). Guide to Federal Consistency Coastal Zone Management § 307. N. H. C. Program, New Hampshire Department of Environmental Services**:** 39.
NHEP (2000). New Hampshire Estuaries Project: Management Plan 2000. Portsmouth, NH, New Hampshire Estuaries Project.

NOAA (2004). New Priorities for the 21st Century: NOAA Strategic Plan 2005 - 2010. N. O. a. A. A. U.S. Department of Commerce, NOAA**:** 26.

Oceans_Commission (2002). Developing A National Ocean Policy: Mid-Term Report of the U.S. Commission on Ocean Policy. Washington, D.C., U.S. Commission on Ocean Policy.

OCRM (2003). Coastal Zone Management: Celebrating 30 Years of the Coastal Zone Management Act. C. P. D. NOAA Office of Ocean and Coastal Resource Management, NOAA**:** 1.

Pandolfi, J. M., J. B. C. Jackson, et al. (2005). "Are U.S. Coral Reefs on the Slippery Slope to Slime." Science **307**: 1725 - 1726.

Pauly, D., V. Christensen, et al. (1998). "Fishing down marine food webs." Science **279**: 860 - 863.

Pauly, D. and J. Maclean (2003). In A Perfect Ocean: The State of Fisheries and Ecosystems in the North Atlantic. Washington, D.C., Island Press.

Pesch, G. and P. Wells, Eds. (2004). Tides of Change Across the Gulf: An Environmental Report of the Gulf of Maine and Bay of Fundy. Prepared for the Gulf of Maine Summit: Committing to Change, St. Andrews, New Brunswick, Gulf of Maine Council on the Marine Environment and Global Programme of Action Coalition for the Gulf of Maine.

Plater, Z.J.B., R.H. Abrams, et al. (2004). Environmental Law and Policy: Nature, Law and Society. New York Aspen Publishers.

Richert, E. and L. Incze, Eds. (2003). Prototype Biophysical Maps of the Gulf of Maine. Portland, Maine, Island Institute.

Safina, C., A. A. Rosenberg, et al. (2005). "U.S. Ocean Fish Recovery: Staying the Course." Science 309(5735): 707 - 708.

Sherman, K. (1994). "Sustainability, biomass yields, and health of coastal ecosystems: an ecological perspective." Marine Ecology Progress Series **112**: 277 - 301.

Smith, P. C. (1997). Vertical Exchange Processes in the Gulf of Maine. Proceedings of the Gulf of Maine Ecosystem Dynamics Scientific Symposium and Workshop, Hanover, NH, Regional Association for Research on the Gulf of Maine.

Steneck, R., and J. Carlton. (2001). Human Alterations of Marine Communities: Students Beware. Marine Community Ecology. M. e. a. Bertness. Sunderland, Massachusetts, Sinauer Associates, Inc.**:** Chapter 17.

Steneck, R. S., J. Vavrinec, et al. (2004). "Accelerting Trophic-level Dysfunction in Kelp Forest Ecosystems of the Western North Atlantic." Ecosystems **7**(4): 323-328.

Sutinen, J. G., editor, P. Clay, et al. (2000). NOAA Technical Memorandum NMFS-NE-158: A Framework for Monitoring and Assessing Socioeconomics and Governance of Large Marine Ecosystems, NOAA**:** 1 - 32.

Ullsten, O. (2003). The Politics of the Environment. Managing for Healthy Ecosystems. D. J. Rapport, W. L. Lasley, D. E. Rolstonet al. Washington, D.C., Lewis Publishers**:** 11 - 19.

USACE (2002). U.S. Army Corps of Engineers Strategic Operating Principles. USACE, U.S. Army Corps of Engineers.

USCOP (2004). An Ocean Blueprint for the 21st Century. Honolulu, U.S. Commission on Ocean Policy**:** 465.

USEPA (2002). U.S. Eighth Response to International Joint Commission, U.S. Environmental Protection Agency.

USFWS (2000). U.S. Fish and Wildlife Service Strategic Plan: 200 - 2005. D. o. Interior, Department of Interior**:** 80.

USGS. (2001, August 10, 2001). "National Water Quality Assessment Program: New England Coastal Basins." Retrieved February 13, 2003, from http://water.usgs.gov/pubs/FS/fs-060-97/.

VanderZwaag, D. (1995). Canada and Marine Environmental Protection: Charting a Course Towards Sustainable Development. London, Kluwer Law International.