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**Looking Forward: Developing A Federal Strategy, Vision and
Operational Capacity for Managing the Gulf of Maine**

Members of the Commission:

It is a great pleasure to be invited to address you in this historic hall as a member of the Public Interest Panel of the Northeast Regional Public Meeting. The importance of the work of the U.S. Commission on Ocean Policy cannot be overstated. The subject matter you have been charged with addressing is complex and extensive, exceeded only by the scale of the territorial oceans and the exclusive economic zone themselves.

It is appropriate that we are meeting at Faneuil Hall to talk about New England's regional seas, because there is no doubt that we are in the midst of both historic times and historic opportunities as far as ocean management policy and practice is concerned. The bounty of the Gulf of Maine has been the source of human survival and well-being since pre-historic times. More recently, human activities, leveraged by ever improving technologies, have increasingly dominated this ecosystem and greatly reduced and altered its ecological goods and services. Indeed, the physical alterations to the system and the changes in species composition and species dominance are so significant that the dynamic shifts in the system are still manifesting in unpredictable ways.

Before providing CLF's comments, I wanted to say a few words about the Pew Oceans Commission. Their efforts to date have been remarkable in their breadth, their clarity and their strong stewardship vision for US waters. Indeed, one is tempted to simply say, "Yes, they've got it; just do that!" I urge the Commission to carefully review and consider all the recommendations that are emerging from this important initiative from the private sector.

I. Institutional Background on CLF

Conservation Law Foundation (“CLF”) is the oldest regional environmental advocacy organization in the country, started in 1966 in Boston. We now have offices in Maine, New Hampshire, Massachusetts, Vermont, and Rhode Island and work to solve persistent environmental and conservation problems affecting the New England environment. In our marine work, we also work cooperatively with similar conservation organizations in the Atlantic Provinces of Canada, reflecting the common property aspects of the Gulf of Maine.

CLF has worked for more than twenty-five years on marine resource management in the Gulf of Maine, starting with our efforts to preserve and protect the living resources on Georges Bank from the potential negative effects of offshore oil and gas drilling in the 1970’s. The heart of our argument there was that the world-class reputation and sustainable potential of Georges Bank for fish production far outweighed its relatively minor, one-time value to the Nation as a source of oil or gas resources.¹

The Georges Bank oil and gas battles were soon followed by a different set of challenges much closer to home: municipal pollution. Starting in 1983, CLF brought a series of cases aimed at eliminating the discharge of under-treated municipal sewage and industrial wastewaters into the coastal waters of New England, commencing with the Boston Harbor discharge. Now almost two decades and several billion dollars of sewerage investments later, the coastal waters near metropolitan Boston, the Massachusetts North Shore, and Buzzards Bay to the south are far cleaner. Harbor porpoise and seals now chase prey into the inner harbor in Boston to the delight of both marine biologists and tourists alike. What was once called the “dirtiest harbor in America” in 1988 by then-presidential-candidate George H.W. Bush is now the site of the Boston Harbor Islands National Recreational Area. CLF has continued to work on coastal pollution, focused now on the more ubiquitous problem of non-point run-off and coastal development pollution.

As the largest polluters in the region began to improve their performance under judicial scrutiny, CLF expanded its marine agenda to include fisheries management in response to a growing recognition on our part – fueled in no small measure by an increasing number of calls we were receiving from frustrated fishermen in the late 1980’s – that an increased number of commercial fish species were being over-harvested in violation of federal law. The managers were not managing and the

¹ Despite recent fisheries mismanagement, CLF continues to believe that the highest and best use for Georges Bank is connected to its living marine resources, not its geological resources.

inevitable result was that once-abundant populations of commercially important fish were being decimated.

While CLF's intervention potentially averted a more significant natural resource calamity such as the collapse of cod in the northwest Atlantic Ocean off Labrador and Newfoundland, the total biomass of New England's commercial fish plummeted through the early 1990's, reaching the lowest levels in recorded history in 1994, before leveling off and slowly beginning to rebuild in most, but not all, cases. Our fisheries work continues to occupy much of our attention.

Finally, in 1997, CLF identified habitat protection as the missing link in the ecosystem safety net we are attempting to construct to insure the long-term sustainability and diversity of the Gulf of Maine and New England waters. We prepared three publications -- *The Wild Sea: Saving Our Marine Heritage* and *Effects of Fishing Gear on the Sea Floor of New England* (prepared in partnership with MIT Sea Grant) and *Conservation Coast-To-Coast*² -- as part of an educational effort aimed at the general public on the importance of ocean bottom habitats and at promoting the protection of marine habitats through the use of marine protected areas. We are also part of Restore America's Estuaries, Inc., a critical national effort to restore lost coastal habitats about which you will hear more today from Curt Spaulding and John Atkin.

II. The Gulf of Maine Ecosystem Requires an Ecosystem-Based Strategic Approach and Capability

The one aspect of the Gulf of Maine system that eclipses all others as a context for management is the fact that the 35,000 square-mile Gulf of Maine is actually a semi-enclosed sea. Bounded on the east by the glacial structure we now know as Georges Bank and Browns Bank to the north in Canadian waters, there are spots 140 or more miles due east of Boston that are less than ten feet below the surface of the sea. It is estimated that it takes a particle, driven by the 50+ foot tides in the Bay of Fundy, approximately three months to circulate within the resulting "sea-beyond-the-sea" on the prevailing currents, which were first -- and very accurately -- described by Bigelow in 1922.

The Gulf of Maine is a well-defined ecosystem, or bioregion, managed by a patchwork of international, national, interstate, state, and local jurisdictions and authorities. The health of this system is a reflection of the degree to which we are monitoring, constraining, and adapting our activities on an ecosystem level to the natural constraints and parameters of the system. The ultimate biological health of the Gulf

² Submitted separately for the Commission's record.

of Maine is a direct function of our capacity and effectiveness in four managing interactive system variables: water quality, living resources extraction rates, habitat protection and governance.

More than any other signal, the diversity and abundance of living marine life provides the best, practical measure of the success of the Nation's marine resource management efforts, integrating in one metric the collective success of our efforts to manage pollution, harvest rates and habitat protection. By terms of that metric, CLF's judgment is that marine resource management in the Gulf of Maine region must in general receive poor marks.

As CLF thinks about the future of the Gulf of Maine, our sense is that the key to success lies in developing both an integrated federal strategy, a compelling public vision for the resource, and an operational capability of our collective institutions to drive management at all levels of government in the Gulf of Maine to effectively protect water quality, ensure the sustainable development of living marine resources, and safeguard marine biodiversity through the protection of marine habitats. This represents a significant, but not unachievable, challenge. The principal contribution of this Commission to this challenge is both to identify institutional responsibilities for meeting this challenge and to identify and promote the elimination of legislative, policy or resource barriers to its fulfillment so that effective, new programs can be developed.

1. Protect Water Quality

The Gulf of Maine receives barely passing grades for its success with system-wide water quality management. The consequence of the "sea-beside-the-sea" context of the Gulf of Maine is that pollution is everyone's problem: there is no "away" in the Gulf of Maine. Cape Codders and Canadians in Nova Scotia were justifiably as concerned about the massive, under-treated discharges from metropolitan Boston as "downeast" Mainers are about discharges from St. John, New Brunswick and other sources of pollution from the Canadian Maritimes, carried down into Maine's waters by the strong southwesterly Maine Coastal Current. The coastal currents are not just pollutant transport mechanisms, however, they are the central to the ecological processes of the Gulf, transporting not just food in the form of nutrients and plankton for species at the lower ends of the food web but also the eggs, larvae, juveniles, and adults of many of the 105 species of fish native to the area. Birds and mammals in dense concentrations are never far from this abundant food source.

The abundance and diversity of the Gulf of Maine, therefore, is directly connected to the water quality of its waters. The water quality of the Gulf of Maine is under tremendous pressure from population increases. Approximately one-third of the US and Canadian populations (75 million and 9 million respectively) live within a day's drive of the Gulf of Maine. There are more than 240 major and 1,700 minor sewage and industrial waste point sources discharging into the Gulf on a daily basis. Additional pollution arrives from non-point source runoff. Various calculations have been made documenting the enormous and ubiquitous system impacts of the oil pollution from leaking automobiles and other sources, draining to the Gulf through storm run-off in volumes that eclipse any single-event catastrophic oil spill in the region.

In Maine, for example, 229 water bodies do not meet Maine's water quality standards. The majority of these are located along the coast and many of the others drain to the Gulf of Maine. The leading causes of water quality failures are the result of organic matter, nutrient enrichment, and pathogens (bacteria). To date, Maine has completed only 14 plans to restore these degraded waters. Under regulations originally issued in 1992 under the Clean Water Act, states should have substantially completed this planning exercise and begun to restore these critical coastal waters.

The Gulf of Maine Council on the Marine Environment, an interstate/province cooperative effort, has concluded: "nonpoint sources of pollution in the Gulf, including urban runoff, failing septic systems, shipping and boating activities, and deposition of air and river borne contaminants, represent the greatest threat to the nearshore environment because of their chronic and ubiquitous nature, their cumulative effect, and the difficulty of control or abatement." *The Gulf of Maine: Sustaining Our Common Heritage*, GOMCME at 31 (1989).

While it is difficult to define a precise, causal connection at present between changes in water quality and any associated shifts in species composition and abundance in the receiving waters, there are numerous bodies of water such as Penobscot Bay in Maine that are now essentially barren of flounders, cod and other fish notwithstanding the fact that there hasn't been any recreational or commercial fishing for these species in the Bay for more than thirty years. Millions of pounds of fish were once landed from Penobscot Bay and the loss of these fish is both an economic as well as ecological loss to Maine of enormous proportions. The continued release of nutrients; hydrocarbons; persistent, bio-accumulative toxins, air-borne compounds such as mercury; chlorine; and other pollutants into the Penobscot River and other watersheds of the Gulf of Maine must be examined and halted. The 1972 promise of

fishable, swimmable waters of the federal Clean Waters Act is still too often empty in the Gulf of Maine.

The newest source of pollution in the Gulf of Maine is salmon aquaculture farming operations. Grown to a reported \$100 million industry in coastal Maine, salmon pens occupy the bays of coastal waters, primarily in downeast Maine although now expanding to the south, discharging significant quantities of organic and chemical pollutants. Accumulated wastes under pens can smother bottom-dwelling organisms and create anoxic conditions in the seabed sediments. In addition to direct decomposition effects, oxygen depletion can result from nutrients in the waste that can stimulate the growth of marine plants and algae, which then die and decompose in turn.

A typical salmon farm in Maine can discharge over 600 metric tons (mt) of solid waste, and additional nutrients in the form of nitrogen and phosphorus that are the equivalent to the sewage discharged by a community of 20,000 to 40,000 people (Attachments 1 & 2). While technology is being developed that will capture perhaps as much as 50 percent of the solid waste from salmon farms, about 80 percent of the nitrogen released is in dissolved form (ammonium) making it immediately available to phytoplankton, and possibly is already a contributing factor to harmful algal blooms in the Passamaquoddy Bay region. To put this in perspective, considering that in 2000 there was over 16,300 mt of salmon harvested in Maine, there was 4,737 mt of solid waste³ and between 650,000 and 1,000,000 kg of nitrogen discharged to Gulf of Maine waters with minimal monitoring by state regulators -- and no effluent limitations in place. This is unconscionable! The result of this unregulated pollution is an overall decrease in water and habitat quality where salmon farming is taking place. Unfortunately, to date what research has been conducted on the ecological effects of salmon farming has focused on small scales (around a particular site) and short temporal scales (one to three years). Virtually no research has been published on the ecological effects across larger scales. Neither is there published research on the fragmentation of benthic habitat on biological communities and ecosystem functions, such as predator prey

³ Estimate of Solid Waste Entering Maine Waters from Salmon Aquaculture in 2000

	Amount (mt)	Source
Farmed Salmon Produced	16,300	(ME Dept. of Marine Resources (2001))
Fish Feed Used	21,190	(1.3 feed conversion ratio)
Feces Produced	2,617	(162 gm/1kg salmon – Bergheim and Asgard 1996)
Uneaten Feed	2,119	(Based on 10% wastage; Burd est. 15% in 1997)
Estimated Solid Waste Disch.	4,736	

Note. Based on 1999 figures, it is estimated the total solid waste discharged to US and Canadian Gulf of Maine waters is about 6,500 mt, and total nitrogen is between 888,000 and 1,330,000 kg (Lotze and Milewski 2002).

relationships and energy flows. Further, no direct research has been done on the multiple of cumulative impacts of aquaculture (e.g., aquaculture combined with sewage and pulp mill effluent.).

Fish farms also discharge chemical pollutants, including antibiotics and other drugs used to prevent or treat disease in the pens, pesticides used to treat parasite infections, disinfectants, and cage anti-fouling paints. Some of these chemicals have never been tested in the marine environment; others are known to have toxic effects on marine organisms. Concerns have also been raised about pathogen releases or exchanges between farmed fish and wild species.

Pen culture expansions have been limited in Maine in part because of the difficulty in finding appropriate sites for salmon, which are sensitive to ocean temperature and can be killed in many areas from cold water. As new cultivars of salmon are developed, it is likely that the cold sensitivities of current hybrids will be reduced. Moreover, there is intense interest in developing other species for farm production that may be more tolerant of colder waters. Our prediction is that pen-cultured fishing will continue to expand in Maine and other coastal states and, properly managed, it should expand. Aquaculture is an appropriate use of our oceans. It is critical, however, that finfish aquaculture be properly managed and regulated.

Finally, the nightmare that looms over every ecosystem is a catastrophic event such as a oil tanker accident. A spill the size of the Exxon Valdez in the wrong location would coat every shoreline in the western Gulf of Maine in an oil slick from the head of the Bay of Fundy to Cape Cod. The dispersion of the oil would be rapid and, to some extent, uncontrollable. The recent Supreme Court *Intertanko* decision reversed nascent efforts in Maine, Washington and other coastal states to develop improved coastal navigation, pilotage, and safety rules for maritime commerce that protected state ecological and economic interests. The regulatory gap left by the Intertanko decision has not yet been filled by federal programs.

Canada imports much of its oil by tanker through the Gulf of Maine to the Port of St. John. Much of Maine's oil is imported through the Port of Portland. Similar traffic exists in Portsmouth, NH and Boston, MA. The Coast Guard's vessel safety rules and inspection programs are not strong and we suspect the capacity of the agency to execute its

mission has been dramatically reduced by its new Homeland Security obligations and responsibilities.⁴

A catastrophic oil spill event in the Gulf of Maine is inevitable. We are unprepared to minimize our exposure to such an event and unprepared to respond to such an event when it happens. All of our efforts to restore and protect this vital ecosystem will be lost if we do not take immediate steps to confront this issue.

Water Quality Recommendations:

- *Federal and state governments must fully implement the provisions of the Clean Water Act and embark on a comprehensive and accelerated effort to clean up impaired coastal waters and contaminated sediments from point and non-point pollution*
- *U.S. EPA must expeditiously complete “aquatic animal production” effluent guidelines that provide strong protection of water quality from the waste and chemical discharges of finfish aquaculture operations and Clean Water Act discharge permits that effectively protect water quality at the local and regional scales must be issued to all aquaculture operations.*
- *Research must be undertaken that examines 1) the multiple and cumulative impacts of aquaculture waste discharges on a bay-wide (ecosystem) scale, and 2) the benthic habitat impacts of aquaculture facilities.*
- *US Coast Guard programs relating to vessel safety, coastal and international maritime trade, and catastrophic spill avoidance response must be upgraded and expanded to reduce the risk and effects of accidents, spills, exotic species introductions through ballast water discharges.*
- *International mechanisms to improve coordination and management of international sources of pollution into shared marine resource waters should be expanded, including exploration of the negotiation of new water quality treaties and feasibility evaluation of the enhancement of the activities of the International Joint Commission in the Gulf of Maine and Pacific Northwest international waters*

2. Improve Sustainable Living Resources Management

⁴ The vessel safety recommendations extend in equal measure to improving the safety inspection system for fishing vessels. We believe many lives are lost that could have been saved through a more rigorous vessel inspection program.

The Gulf of Maine’s agencies are currently failing the management challenge with respect to sustaining an abundance and diversity of marine life in the Gulf. Examples include numerous overfished commercial species, fatal by-catch and other mortalities of marine mammals, sea turtles, and birds, invasions of exotic species such as green crab, and inadequate coordination with Canada on “trans-boundary” living marine resource issues. There is substantial and uncontroverted evidence that selective and excessive fishing pressure over the years in the Gulf of Maine has altered species composition, eliminated or greatly reduced top-end predators in the food web, reduced the sizes and age-class diversities of fish populations, and reduced the abundance of commercially harvested finfish and shellfish species to some of the lowest levels ever recorded or observed. Some of these failures are institutional failures. That is, there is currently adequate regulatory authority to properly manage species but there is a failure of political will or resources to accomplish the mission. In other cases, new legislative authority is needed.⁵

On the positive side, managers in the Gulf of Maine have learned that nature does respond to effective, strategic management. Scallop management efforts on Georges Bank restored a multi-million dollar fishery in the space of five years, recharging a \$100million+ annual scallop industry in coastal communities like New Bedford, Massachusetts. An offshore herring population that was eliminated for commercial purposes for almost thirty years has now recovered to its former abundance, re-establishing a critical link between trophic levels in the marine food web. Georges Bank yellowtail flounder and haddock, heavily overfished in the late 20th century, are now experiencing significant increases in population abundance. In two words, management works.

CLF has estimated that the economic benefits of rebuilding New England’s commercial fish populations to maximum sustainable levels would produce new economic benefits of more than \$425 million annually to the boats and their crews, in most cases in less than ten years. Those dollars will be multiplied through the coastal economy by the value added by service providers to the fleet and the processing, distribution, and retail end-users. It is difficult to identify any single other sector in the New England economy that offers the potential for similar wealth production with no adverse resource impacts.

⁵ CLF will supply Commission staff with a copy of our law review article that summarizes our earliest fisheries management litigation. Congress has adopted some of the recommendations on fisheries management that emerged from that experience; others have not been adopted.

The Sustainable Fisheries Act of 1996 (“SFA”) provided critical new provisions to the Magnuson-Stevens Fishery Conservation and Management Act, which will help reduce the widespread, de-stabilizing population cycles associated with overfishing, reduce the by-catch of non-targeted or juvenile species, and reduce damage to essential fish habitats by fishing gears and other human activities. The Commission should promote the objectives of the SFA and urge Congress to work to strengthen the SFA. Among other improvements, the Commission should recommend that Congress require that all recreational and commercial fisheries are supported by appropriated fishery-independent observed data on actual landings. Political efforts underway in Congress to weaken the SFA are shortsighted and counterproductive to the region’s and the Nation’s long term interests and should be opposed vigorously.

The Commission should recommend ways to ensure that the determination of biological objectives and subsequent annual fishing mortality adjustments are insulated from political influence during development of fishery management plans within the regional fishery management council system. Too often in New England we have witnessed the New England Fishery Management Council ignore the advice of federal fish stock assessment scientists and recommend management plans that fell short of the scientists’ mortality reduction advice. The determination of biological objectives and necessary adjustments to fishing mortality on any stock or stock complex should be solely the responsibility of federal and state fishery scientists. In turn, the implementation of the scientific advice should be the mandate of the fishery management councils.

In Maine, one of the most successful models of fisheries management – although not fully tested during the stresses of responding to a stock decline – is the coastal lobster fishery. In that fishery, efforts have been made to incorporate the fishing industry actively in the development of community-based management rules and to create “lobster management zones.” The effect of this effort, which has not been easy or quick, is to generate great “buy-in” for the management rules, producing high levels of self-management and compliance with regulations. A similar (but not equal) de-centralization of fisheries management exists in the management of state fisheries through the Atlantic States Marine Fisheries Council, a mechanism for customizing state rules within an overall framework of effective management.

Although the regional council structure of federal fisheries law is an innovative structure for de-centralizing federal fisheries management, the management plans developed at that scale cannot incorporate the variety of fishing activities that take place within the council’s jurisdiction. The social and economic results of this “scale” problem is

that fisheries in New England are rapidly becoming homogenized and consolidated and access to fisheries from traditional fishing communities is being lost.

Also lost in the process is the ingenuity and motivations that individual community-based fishermen have to make the management system work and any natural incentives to provide feedback on the status of the resource. While the resource benefits of community-based management approaches can be exaggerated, CLF believes that such methods should be promoted in order to develop better adaptive management practices, increased stewardship, incentives for improved self-management, and improved compliance. Such approaches reflect the wisdom expressed by Garrett Hardin in “The Tragedy of the Commons,” who argued for “mutual coercion, mutually agreed upon by the majority of the people affected.” 162 *Science* 1243 (1968). The Commission should review and commend community-based management approaches as part of its analysis for improving fisheries management.

One of the persistent problems in fisheries management in the Gulf of Maine is the lag time between data collection, analysis, feedback to managers, and management adaptation, which is generally in the vicinity of two or more years. These data lags result in both under-regulation of harvest levels as fish populations drop (whether from anthropogenic or natural causes) and even the possible over-regulation of harvest levels as populations recover.

Information gaps in fisheries management in this technologically capable era are no longer acceptable or conscionable. The overwhelming weight of scientific advice is that the US needs to shift its fisheries management to an ecosystem-based approach. The key to effective ecosystem management is adaptive management. The key, in turn, to adaptive management is access to dynamic information and analysis.

Without current and accurate information, we are managing more with hope than with knowledge. We now have the technology and the groundwork for an ecosystem information system that could revolutionize how we manage the oceans with existing institutional platforms in the Gulf of Maine, such as the Census for Marine Life, GOMOOS (Gulf of Maine Ocean Observing System), GLOBEC (Global Ocean Ecosystem Dynamics), and RARGOM (the Regional Association for Research on the Gulf of Maine). These efforts must be expanded, elaborated, coordinated, to meet concrete management needs, with a sustained commitment to funding at appropriate resource levels.

Resources for funding these efforts should be provided through the development and imposition of resource rents on marine catch. There is no longer any justification for the failure to extract rents from

commercial and recreational users of our oceans. This failure to extract rents cripples our collective ability to appropriately manage the ocean. One of the major contributions this Commission could make to structurally improve marine resource management is to articulate and champion the development of a resource rent structure for all commercial and recreational users of federal waters that would provide dedicated and sustainable funding to marine science and management. Measures to provide negative incentives to minimize and avoid by-catch could be built into this rent structure as well.

Overcapacity is an enormous problem in New England fisheries. The Commission should also recommend a suite of measures to reduce the overcapacity that is plaguing so many of the nation's fisheries. Industry funded buyback programs, capitalized initially through a federal loan, may be a viable way to reduce the nation's fishing fleets on a voluntary basis. Federal loan programs that encourage an increase in fishing capacity should be strictly discouraged.

Living Resource Recommendations:

- *Congress should strengthen the Sustainable Fisheries Act to insure that:*
 - *the Nation's fisheries are restored to and maintained at maximum sustainable levels at the earliest practical time;*
 - the determination of biological objectives and criteria is insulated from political influence by vesting that decision making with agencies or entities other than the regional management councils;*
 - *by-catch of marine mammals, sea turtles, and other non-target living resources is minimized through funded observer programs and concrete management measures;*
 - *habitat impacts are minimized through an improved analysis of the impacts of different fishing gears on ocean habitats and protection through area management or improved gear;*
 - *all fisheries are supported by statistically appropriate, fisheries-independent observed data on actual landings;*
 - *community-based management efforts are encouraged to better minimize the social and economic impacts of fisheries management and to improve community support for management objectives;*
 - *community access to the Nation's fisheries is preserved; and*
 - *over-capitalization of fishing fleets is controlled.*
- *Congress should authorize the development of resource rents for all major commercial and recreational marine activities to create a dedicated funding stream for marine science and management.*

- *Congress should amend the Coastal Zone Management Act to promote the development of inventories and identification of strategic coastal infrastructure associated with the long-term, sustainable development and improvement of the US fishing industry to enhance the Nation's competitive position in the world marketplace of sustainably caught seafood and to insure community access to the Nation's fisheries at a diversity of ports throughout the United States.*

3. Protect Biodiversity Through Habitat Protection

With the possible exception of the shallowest shoal waters of Georges Bank, there is not a single square meter in the 35,000 square mile Gulf of Maine that is fully protected from all human activity. And even the naturally protected biological communities of Georges Shoals are not immune from the indirect effects of pollution in the Georges Bank current gyre. An estimated 65% of the Canada's estuary habitats and 30-50% of US estuary habitats have been degraded or destroyed since the arrival of colonists in the Gulf.⁶

The single most important action that the US Commission on Marine Policy could promote for the benefit of the long-term health and productivity of the Nation's marine waters is to mandate that ecologically important and unique marine habitats be identified and protected from all adverse, extractive and disturbing human activities. From a structural perspective, this is the key gap in current marine resource management. Stated differently, without the development of fully-protected marine protected areas, it is likely that the net productivity of our nation's ocean and coastal systems in terms of marine biodiversity will continue to decline.

There are four fundamental reasons to develop an integrated network of fully protected marine areas in our nation's ocean waters. First and most fundamental, fully-protected marine protected areas (or fully protected MPAs) conserve local, regional, and nationally significant marine biodiversity. While such biodiversity has current and potential future commercial value, the primary justification is the biodiversity itself: a proper network of fully protected MPAs is the only way to protect the integrity of the marine ecosystem itself.

The second purpose for a well-designed, fully protected MPA system in the Gulf of Maine (one that we believe can be largely, if not entirely, captured by the proper design of a system for protecting

⁶ *The Gulf of Maine: Sustaining Our Common Heritage*, Gulf of Maine Council on the Marine Environment at 30 (1989).

biodiversity) is protection of the core spawning biomass of commercial important or ecologically critically fish species in a “permanent reserve” status. In the New England Yankee tradition of “don’t touch the capital!” that has preserved some family wealth through numerous generations, sustainable fisheries management would be improved and predictability in the fishing industry would be enhanced if we were able to put a substantial portion of the spawning biomass “in the bank” and beyond the annual harvest-level-setting exercises. Different estimates are thrown around, rather loosely we would admit, but CLF’s current thought is that an appropriate goal might be on the order of protecting 25% of the spawning biomass in fully protected MPAs.

A third purpose and equally critical function for fully protected MPAs is their use as living laboratories and control sites for US and Canadian marine science and management activities. The availability of background research sites as controls is indispensable to a proper understanding of the actual or potential impacts of human activity on the marine ecosystem and provides important feedback data on the degree to which the first and second purposes for the fully protected MPA program are being accomplished. The availability of such sites also provides critical information for environmental review of the risks and relative impacts of resource extraction (fisheries, oil and gas development, etc.) outside the protected areas. Such sites are also essential to our advancing our understanding of how the Gulf of Maine ecosystem works.

The final purpose for such sites is for the promotion and cultivation of public education and increased public engagement in the understanding, protection and stewardship of the Gulf of Maine. The public outreach and education programs of the Stellwagen Bank National Marine Sanctuary and the two National Estuary Research Reserves in the region are testament to both the public interest and the popularity of programs developed around MPAs.

One place that the federal government could start in promoting the use of fully protected areas as a conservation tool is to proactively designate a portion of Stellwagen Bank National Marine Sanctuary as a fully protected area. Currently, the Sanctuary offers only limited protection to the diversity of marine life that reside there--only oil and gas exploration and dredge spoil disposal is prohibited in the 842 square mile area. The Sanctuary’s management plan is now under review and NOAA, the federal agency charged with implementing the authorizing legislation, should take this golden opportunity to set aside a portion of the Sanctuary to afford living marine resources with the maximum protection possible from human extractive and disturbing activities. A similar area was designated within the Florida Keys National Marine

Sanctuary and there is no reason why each of the 13 National Marine Sanctuaries should have fully protected areas within their jurisdictions.

The second most important positive outcome from the Commission's activities with respect to improving the function of marine habitats would be the full funding and implementation of the Estuary Restoration Act of 2000. As noted above, the Gulf of Maine has lost a sizable component of its production system in the cumulative loss of its estuary habitats.⁷ While wetland regulations have significantly slowed new losses, at least in the US, core productivity in the system has been reduced. Restoration of estuary habitats is essential to restoring some of this core production function. A national effort focused on estuary restoration is necessary for at least three reasons:

1. the interlocked nature marine food webs and their supporting estuary habitats
2. the migratory nature of many of the marine and coastal species of fish and birds, and
3. the requirement for coordinated ecologically-based management strategies for effective action.

The Estuary Restoration Act of 2000 provides the framework for this federal effort. It requires the coordination of federally-funded estuary restoration efforts and promotes the restoration of 1,000,000 acres of estuary habitats by the year 2010. This Commission would significantly advance the improvement of the Gulf of Maine ecosystem by promoting funding and full implementation of that program. Restore America's Estuaries, Inc. will provide further information on this critical legislation directly to the Commission.

Biodiversity Recommendations:

- *Congress should enact legislation mandating and appropriating funds to support the development of a network of fully-protected marine areas that are designed to protect ocean wildlife, habitats, and ecosystems*
- *The Commission should recommend to NOAA that they actively pursue designating a portion of the Stellwagen Bank National Marine Sanctuary (and all other Sanctuaries) as a fully protected area through the Management Plan Review process.*

⁷ Watershed productivity in the Gulf of Maine is further crippled by numerous dams with poor or no fish passage, blocking the anadromous species that are important to ecosystem health.

- *The Commission should charge each agency with marine resource management authority, including without limitation the National Marine Sanctuary program, with full implementation of Executive Order 13158, pending the enactment of comprehensive MPA legislation.*

4. Improve Ecosystem Governance

The degradation of Gulf of Maine is a classic example of the common property problem, described so brilliantly and aptly by Garrett Hardin in his “The Tragedy of the Commons” where “[e]ach man is locked into a system that compels him to increase his [private economic activity] without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom on the commons. Freedom in a commons brings ruin to all.”⁸ Hardin’s solution to the commons management problem was, as noted above, “mutual coercion, mutually agreed upon by the majority of the people affected.” Such mutual coercion, mutually agreed upon requires a governance structure that is designed to accomplish such a purpose organized at the appropriate scale. There is no such federal institutional structure for US coastal waters in general or for the Gulf of Maine in particular.

The design of an appropriate structure for an ecosystem like the Gulf of Maine is not an easy task, either conceptually or in practice. One prominent common property scholar has stated: “Any governance system that is designated to regulate complex biological systems must have variety in the actions it can take as there exists in the systems being regulated.” E. Ostrum (1995)(after W. Ross Ashley’s Law of Requisite Variety in Design for a Brain: The Origin of Adaptive Behavior (1965).

At present, the United States certainly has the *variety* of organizations with some form of marine resources jurisdiction or another in spades, with agency counts running from the mid-40’s to the low 70’s. What is lacking in that institutional collection is the *brain*, that is, a central coordinating mechanism that works to insure that the body’s other organs are accomplishing the core mission of sustainable life. Many argue that US oceans policy will always suffer from multiple handicaps unless the equivalent of a “department of oceans” brain is developed and given the authority to identify, promote, and pursue strategic national interests in US waters as well as the authority to resolve resource use conflicts and competing agendas for regulatory agencies consistent with the Nation’s best interests.

⁸ 162 Science 1243 (1968).

Indeed, CLF has argued for some time that the levels of competing activities and demand for marine resources and marine-based industries have already reached the point of diminishing returns and that the current process of priority-setting-by-permit is no longer capable of protecting core functions and uses of Gulf of Maine waters. Different forms of ocean zoning or area management need to be explored as proactive mechanisms for resolving programmatic conflicts between user groups and competing programs.

Two emerging marine development activities illustrate the difficulty of marine resources “planning-by-permit” as it is presently practiced: aquaculture and wind farm development. Both of these forms of economic activity are in the national interest. Aquaculture produces additional protein from the ocean that can supplement wild stocks in the marketplace and can be managed in ways that minimize adverse environmental consequences. Wind power is a sustainable energy source that provides an important clean substitute for fossil-fuel or nuclear fuels, reducing the emission of climate-change pollutants. Both have to happen in our marine waters.

Development of these industries is complicated by the siting conflicts and transaction costs associated with permitting what is essentially a significant, new industrial use of coastal and offshore waters that are already heavily used for fishing, recreation and tourism, navigation, and shipping purposes. If these industries are going to develop, it would make sense to consider a proactive siting process that might zone appropriate sites for coastal or offshore development through a federal process with specific leases given on a request-for-proposals basis. Similar proactive “zoning” discussions would facilitate the review of the siting of energy utility pipeline corridors, simplifying and separating the generic environmental and resource review questions from the particular questions associated with individual projects.

No agency has the jurisdiction or mandate at the present time to develop such area management approaches to resource development activities in the territorial sea or EEZ. A “department of oceans” *could* respond to that institutional vacuum.

At the same time, such enlightened government probably isn’t going to happen any time soon and CLF is interested in promoting interim approaches that will immediately begin integrating and prioritizing activities necessary for the restoration and protection of the Gulf of Maine’s ecosystem at the federal scale. This activity in the Gulf of Maine would parallel and complement the efforts of the Gulf of Maine Council on the Marine Environment, but operate on the federal plane. The science and information needs of such an exercise would be provided

by the Northeast Fisheries Science Center, various NOAA monitoring programs, GLOBEC, RARGOM, GOMOOS, the Gulf of Maine Census of Life Project, and other of the outstanding regional institutions. The Gulf of Maine is probably one of the best-studied marine bodies of water on the planet. This data needs to be put to work.

Five tasks are essential to mapping out a coordinated, intelligent plan of action designed to advance the future health and well-being of the nation's marine waters and resources:

1. Coordination and synthesis of marine and coastal basic and applied research and data collection on a regional scale, if not nationally.
2. Identification and review of the range of commercial and recreational activities currently underway in our nation's ocean waters and projections by industry on future demand for the nation's marine resources.
3. Identification of the range of environmental and management threats to the health of the nation's marine resources with appropriate risk assessment calculations on a regional scale and analyses of legal authorities for or legal barriers to addressing these issues. The need to develop improved relations with Canadian programs or other international resource management jurisdictions would be fundamental to this task in the Gulf of Maine.
4. Development and implementation of a federal action plan based on environmental priorities that assigns responsibilities to the various agencies with marine resources jurisdiction.
5. Development of a funded, public participation process that would provide maximum transparency and access to the federal process consistent with accomplishing the activities in a reasonable time.

The proposed structure of these regional federal strategic ocean management plans might replicate the regional structure created through the Fishery Conservation and Management Act to avoid reinventing the wheel on the demarcation of appropriate national bioregions, although that certainly isn't the only model. Regional plans should be integrated and synthesized into a national strategic plan developed by a federal task force of lead agencies with marine resources jurisdiction, which could proceed parallel with the regional planning efforts or sequentially. The charge to these planning exercises would be

designed by this Commission through its Report and executed preferably through legislation.⁹

Governance Recommendations:

- *The capacity for integrated federal management at the scale of the regional sea must be developed in the US by new legislation or executive order.*
- *Regional federal task forces must be organized and charged with the task of identifying, integrating, promoting, and protecting strategic federal interests in the nation's oceans through regional action plans developed after a transparent, funded public planning process.*
- *Ocean zoning or area management strategies must be developed with appropriate programmatic environmental review to resolve conflicts between coastal and ocean zone uses and activities, allow the development of appropriate new uses of the nation's waters, and to optimize the forward-looking stewardship of these irreplaceable resources.*

III. Conclusion

In the late 1960's, the Stratton Commission worked to develop a strategic ocean policy for the nation. From the energy harnessed and focused by that remarkable effort, NOAA was born and the seeds for far-reaching pieces of federal legislation dealing with fisheries; oil, gas, and mineral development; and coastal zone management were sown. Since then, the pressures on our oceans have magnified in an extraordinary way while the area over which we govern has grown dramatically with the addition of our 200-mile "exclusive economic zone." We have yet to reap the full rewards of these programs and legislative initiatives, although it is equally clear that our coastlines and coastal waters would have been in far worse shape had these initiatives never been launched.

The Commission on Ocean Policy provides the nation with the first official opportunity in more than 30 years for a fresh look forward at the challenges and opportunities that lie ahead. Dr. George M. Woodwell of The Woods Hole Research Center summed up the challenges the Commission faces in the following manner: "The world is now full as opposed to empty and the rules of operating are different."

⁹ Alternatively, this strategic planning exercise could be implemented through presidential executive order.

Congress charged the US Commission on Ocean Policy with developing those new operating rules for our oceans. We hope that you will fulfill that solemn responsibility and trust with courage, insight, creativity, and vision for what could be.

In 50 years, people will look back on the decisions we are making now with respect to the stewardship of our oceans and, I predict, they will point to this time and this Commission's activities as the key moment and event when either we met our challenges as a maritime nation or we failed to do so. There is no question in my mind that the work of this Commission will play a vital role in the ultimate determination of that strategic question.

Thank you again for this opportunity to address you and provide you with our thoughts on the important mission of this Commission. I will be happy to answer any questions you have for me today and Commission staff should feel free to contact CLF for further information on our recommendations or testimony that they would find useful in the course of your deliberations.