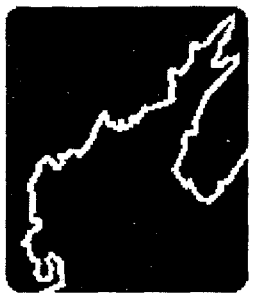
The Nomination of the

Gulf of Maine Estuary

to the
National Estuary Program



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Overview of the Gulf of Maine Nomination

What is unique about the Gulf of Maine nomination?

The nomination of the Gulf of Maine to the National Estuary Program offers the Program some unique features not available in other estuary programs. Several of these include:

- *An international dimension* - The Gulf of Maine would be the only NEP to involve the active participation of Canadian Provinces and the Canadian federal agencies responsible for management of the estuarine environment.
- *Three years of sustained success* - The Gulf nomination offers a unique opportunity for the NEP to capitalize of three years of sustained success in ecosystem management.
- *Established regional goals for pollution prevention & sustainable development* - The goals of the NEP and existing Gulf of Maine Program are compatible and consistent. The pollution prevention and sustainable development focus are priorities in the region.
- *A proven ability to cooperate* - The States and Provinces have proven their ability to develop consensus on tough issues, cooperate in implementing projects, and make progress in improving the health of the Gulf ecosystem.

What do we hope to achieve with NEP designation?

- *Accelerate implementation of current regional plans* - The region has completed a 10-year natural resources action plan that is endorsed by the Governors and Premiers and being implemented. In addition, the region's scientists and environmental managers have agreed on an environmental quality monitoring program and are proceeding with a phased implementation schedule. NEP designation would greatly accelerate implementation of these and related efforts.
- *Focus special attention on water quality issues* - While abating point and non-point sources of pollution is central to the Action Plan, NEP designation would allow the region to move more aggressively in ensuring the Gulf's waters are protected.
- *Implement transboundary resource management goals* - Many resources in the Gulf require a transboundary management approach. Efforts are underway to achieve this goal and can be augmented.

How will the region's leaders work to ensure success?

- *Involve estuarine, coastal, and marine agencies* - The success of the Gulf Program's current efforts is a result of the active participation of the region's natural resource agencies. This effort will be sustained.
- *Involve local governments* - Local government participation in state/provincial comprehensive planning and land use management programs is occurring. These programs will be expanded to ensure Gulf-wide goals and objectives are attained.
- *Continue and expand the participation of region's stakeholders* - Private industries in the region, such as port development, timber products, and aquaculture, have an important role in managing the Gulf and will participate in the decision-making process.
- *Support public education and outreach* - The public must be continue to be informed and involved to ensure success. This constituency exists and will be expanded.
- *Make data and information management a priority* - Since inception of the Gulf Program information management has been integral to our efforts. These efforts are ongoing and will be pursued.
- *Ensure sustained funding is available* - During the past three years the States and Provinces have provided in excess of $300,000 a year to support the Gulf Program. This amount exceeds the NEP match requirements and indicates the region's strong support for the existing program. In addition, a major initiative is underway with the region's philantrophic community to expand funding for Gulf of Maine activities.

WHY THE GULF OF MAINE ESTUARY QUALIFIES FOR A STREAMLINED MANAGEMENT CONFERENCE

Have the major problems impacting the estuary already been identified?

The three states and two provinces bordering the Gulf of Maine have all individually gathered extensive technical information and conducted scientific studies within their own waters. In Nova Scotia, studies by Acadia University Estuarine Studies Centre, supported by the Nova Scotia Department of Environment, have focused on the Annapolis River estuary, and the near shore environment of the Bay of Fundy. In New Brunswick, the Department of Fisheries and Aquaculture has been involved in studies of the benthic environment in Saint John Harbor, and in potential aquaculture sites on Grand Manan Island and the St. Croix River estuary. In Maine, the state conducts a marine monitoring program through the Department of Environmental Protection. Laboratories such as Bigelow Ocean Science Laboratory and the Darling Center have a history of marine research in Maine waters.

Bigelow Laboratory first detected high levels of toxic substances in sediments of Penobscot Bay and Casco Bay in the early 1980s and continues to study the waters of the Gulf of Maine. In New Hampshire, estuarine studies conducted by the Jackson Estuarine Laboratory have focused on the Great Bay National Estuarine Reserve. In Massachusetts, extensive scientific scrutiny has been paid to Boston Harbor. In addition, the University of Massachusetts - Boston is involved, through the Massachusetts Bays Program, in numerous oceanographic studies of the Massachusetts Bays region.

The Gulf of Maine Conference, held in December 1989, provided an excellent overview of the acknowledged environmental problems in the Gulf of Maine. The Proceedings of the conference include technical papers on toxic contamination, eutrophication, public health hazards, ecosystem effects of harvesting, and habitat loss. From the papers and the work sessions that followed, clear statements of the critical environmental threats to the Gulf were made. A subsequent scientific conference on the natural variability in the Gulf of Maine was held in January 1991. At this conference, scientists and environmental managers reviewed existing data and information that characterizes the Gulf, in order to better determine what constitutes adverse change in the marine environment. The Proceedings of this conference, produced by the Urban Harbors Institute in Boston, offer a set of findings and recommendations to guide future research activities in the Gulf of Maine.

Does the nominated estuary have an established management structure that functions similarly to a management conference?

In 1989, the governors and premiers of Nova Scotia, New Brunswick, Maine, New Hampshire, and Massachusetts, signed the *Agreement on the Conservation of the Marine Environment of the Gulf of Maine.* The Agreement was the result of a year's worth of inter-regional meetings among environmental managers and scientists concerned by signs of deterioration in the Gulf environment. Through the Agreement, the governors and premiers established the Gulf of Maine Council on the Marine

Environment, comprised of two appointed representatives from each state and province. Federal agency representatives from Canada and the U.S. have observer status on the Council.

The management arm of the Council is the Gulf of Maine Working Group. The Working Group members are senior staff people within the agencies represented on the Council. Federal agency representatives have voting rights at the Working Group level. The Working Group is responsible for fiscal and strategic planning for the Council, and for oversight of the Council's annual work program and three committees.

The three committees are the Data and Information Management Committee, the Monitoring Committee, and the Education and Participation Committee. The Data and Information Management Committee was formed in response to the clear need for improved management of and access to the diverse marine databases within the region. The committee members are drawn from academia, state, provincial, and federal agencies.

The Monitoring Committee is responsible for oversight of the Gulf of Maine Marine Environmental Quality Monitoring Plan, implementation of which began in 1991. The committee is comprised of university and public agency scientists and environmental policy makers at the state, provincial, and federal levels.

The Education and Participation Committee was created by the Council to develop a regional outreach and participation program. The committee, which has members from the media, school systems, state, provincial, and federal agencies, and the private sector, is responsible for building a sense of stewardship among the residents of the region and for advising the Council on public outreach matters.

Distinct from the Council, the Association for Research on the Gulf of Maine (ARGO-Maine) represents a large portion of the marine science community. ARGO-Maine is actively involved in encouraging marine research efforts in the Gulf, and harmonizing research activities among institutions in the region. The Gulf of Maine Foundation, a private citizen association, devotes its efforts to raising funds to supplement public support of marine research facilities and projects.

In Canada, a citizen organization known as "Coastal Convergence" works to develop public support for improved study and management of the resources of the Bay of Fundy. This group, which includes representatives of the major environmental organizations in the two provinces, was involved in the review of the draft Gulf of Maine Action Plan.

Does the Governors' nomination have the full support of the key state and local entities that would participate in the management conference?

The marine resource management activities in the Gulf of Maine region during the past three years demonstrates strong political commitment from the region leaders. The following actions are examples of their commitment to improving the management of the region's coastal, estuarine and marine resources.

1) Negotiation of the *Agreement on the Conservation of the Marine Environment of the Gulf of Maine* -- In 1989 the three Governors and two Premiers from the five jurisdictions bordering the Gulf negotiated and signed a multilateral agreement regarding the protection of the Gulf of Maine. The Agreement is the clearest indication of the ability of the region's leaders to work collaboratively. The five jurisdictions, through the Agreement, called for the establishment of the Gulf of Maine Council on

the Marine Environment -- a state/provincial institutional mechanism appointed by the Governors and Premiers to coordinate and initiate environmental protection efforts in the Gulf -- and the development of a ten-year natural resources action plan that describes cooperative actions the region will pursue to further the goals of pollution prevention and sustainable development.

2) Establishment of the Regional Marine Research Board -- In response to the federal **Marine Research Act of 1991**, the Governors promptly pursued formation of the Gulf of Maine Marine Research Board. Their initiative distinguishes them from the other ten marine regions in the country, as no other region has established a Board and completed draft Research Priorities Plan.

3) Pursuit and funding of National Estuary Programs in Casco Bay and Massachusetts Bay -- The Governors from Maine and Massachusetts have demonstrated the support of state government for two existing NEP projects in the Gulf since 1990.

NATIONAL SIGNIFICANCE

What is the geographic scope of the estuary?

How the estuary meets the statutory definition.

The Gulf of Maine stretches from Georges Bank in the south to Cape Sable, Nova Scotia in the north. It is a semi-enclosed sea, almost entirely cut off from the Northwestern Atlantic by underwater banks. The influx of over 250 billion gallons of freshwater annually from the six major rivers in the watershed powers the strong counter-clockwise current of the Gulf and provides the nutrients that support the Gulf's high primary productivity. The Northeast Channel, separating Georges Bank and the Nova Scotian Shelf, is the principal source of dense, deep salt water from the North Atlantic (pp.13-14, *The Gulf of Maine: Sustaining our Common Heritage*, hereafter referred to as the *Gulf* report). Only 30 percent of the perimeter of the Gulf is open to the ocean (p.14, NorEaster article) with depths along this perimeter ranging from 10-200 feet.

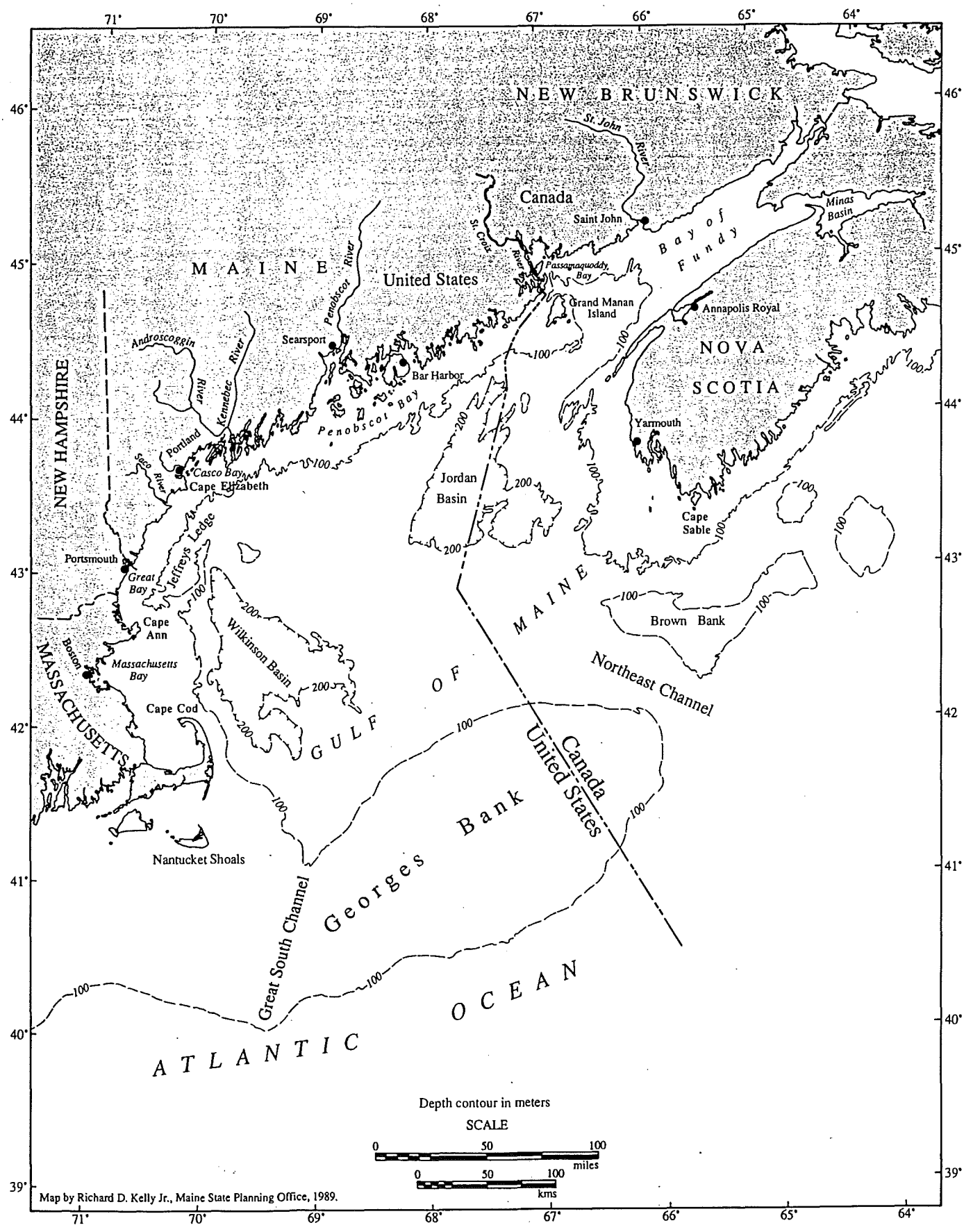
A general description of the estuary watershed.

The Gulf of Maine has an enormous watershed, extending from Nova Scotia in the east to Quebec in the west and to Cape Cod in the south (see watershed map). The major rivers of the Gulf include the Merrimack River, Saco River, Androscoggin River, Kennebec River, Penobscot River, Saint John River and Annapolis River. Salt marshes and tidal flats are characteristic features of the Gulf's coastline (p.15, *Gulf* report). These tidal marshes and flats have been steadily filled or altered since the time of European settlement, resulting in significant reduction in overall acreage (p.30, *Gulf* report; p.4, *The Gulf of Maine Action Plan 1991-2000*, hereafter refered to as the *Action Plan*).

Land uses around the estuary vary. In the more urban southern areas of Massachusetts and New Hampshire, industrial and residential development predominates. In the northern sections of the Gulf coast, principal land uses include residential development as well as forestry and agriculture.

Land use patterns on the shores of the Gulf of Maine have been strongly influenced by economic forces and natural resource conditions. Historically, industries were oriented toward the natural resources-fishing, agriculture, timber, quarrying and depended on coastal waters for transportation and shipping. Rivers flowing into the Gulf provided power to run lumber, grain, and textile mills. Urban areas were concentrated around major ports such as Boston, Portsmouth, Portland, and Saint John, while the remaining coastline was interspersed by small fishing and farming communities. Transportation improvements in the 1950s altered the traditional development patterns, as highways and automobiles facilitated urban expansion and suburban sprawl along the Gulf's southwest shore.

GULF OF MAINE ESTUARY



Why is the estuary important to the Nation?

Recreational value of the Gulf of Maine Estuary to the Nation.

The Gulf of Maine is of tremendous recreational value to the nation as a distinct marine region within one day's drive of nearly one-third of the nation's population -- 75.6 million people (U.S. Census, 1990). Recreational uses of the Gulf include swimming, boating, fishing, sightseeing, bird-watching and other activities.

Each year several million people visit the Gulf of Maine coast, from Cape Cod to the Acadian shores of Nova Scotia, to enjoy the pristine environment, the diverse land and seascapes, the cultural and historical attractions, and the many recreational opportunities the Gulf offers. In 1988, approximately 4.5 million people visited Acadia National Park in Maine, an increase from 3.3 million visitors in 1980, making it the second most visited national park in the United States. Cape Cod National Seashore attracted 5.2 million visitors in 1988, up over one million people since 1980. Fundy National Park has held relatively constant at between 650,000 to over 700,000 visitors over each of the last ten years. (p.24, *Gulf* report).

Commercial value of the Gulf of Maine Estuary to the nation

The commercial value of the Gulf of Maine includes the value of the natural resources harvested from its waters and lands and the value of the uses accommodated by the estuary. These values extend beyond the immediate Gulf region to benefit the entire nation.

Several commercial uses are entirely dependent on the ecological health of the Gulf of Maine. Throughout history, the Gulf of Maine has been valued for its fishery resources. European explorers discovered the Gulf's wealth in the 1500s and returned year after year to harvest fish and carry their catch back to Europe. As we approach the 21st century, the fishing grounds of the Gulf of Maine remain among the most productive and diverse in the nation.

The relatively clean waters of the Gulf of Maine provide important opportunities for commercial mariculture ventures. As wild fish stocks decline along the nation's coasts, commercially raised fish and shellfish are expected to provide a greater proportion of the nation's seafood supply. In the 1980s, the mariculture industry expanded greatly in the Gulf region and further growth is projected in the next decade. Currently, there are aquaculture operations in all of the Gulf jurisdictions, raising primarily Atlantic salmon, rainbow trout, mussels, oysters, and quahogs. Over 200 leases or grants have been given to individuals or companies to raise finfish and shellfish in Gulf waters or on the seabed (p.23, *Gulf* report).

Certain commercial uses, such as transportation and mineral exploration, do not rely on the ecological health of the estuary. In the 1800s ships carried salt cod, lumber, and granite from New England and the Maritimes throughout the Atlantic and Caribbean oceans. Today, Gulf of Maine ports continue to ship products to the rest of the nation and the world and to provide points of entry for critical supplies of gas, oil, coal, and consumer goods. In 1986, 1.9 billion gallons of oil was off-loaded in Portland, Maine, 753 million gallons in Portsmouth, New Hampshire and 3,390 billion gallons in Saint

John, New Brunswick. Each year nearly 100,000 people travel by ferry between Canada and the U.S. Cruise ships made over 100 visits to Gulf ports in 1988.

Energy and mineral exploration is not active in the Gulf, however, reserves are of national importance for future use. The U.S. Department of the Interior estimates that a portion of Georges Bank may be underlain by 20 million barrels of oil and 0.5 trillion cubic feet of natural gas. Canadian Oil and Gas Lands Administration estimates for an adjacent area are much greater - one to two billion barrels of oil and five to ten trillion cubic feet of gas. Over the last thirty years, there have been a number of proposals to drill for oil and gas in the Gulf region. At present there is oil industry interest in proceeding with oil and gas exploration on both the U.S. and Canadian parts of Georges Bank, but concerns about the potential environmental impacts of drilling operations have resulted in moratoriums on exploratory drilling until 2000 in both U.S. and Canadian Gulf waters.

Extensive sand and gravel deposits lie on the seabed of the Gulf of Maine. To date, no mining has taken place, but it is likely that in the future offshore aggregate mining will become economically favorable.

It should not go unmentioned that there are also option and existence values held by people nationally with regard to the Gulf of Maine. Though difficult to measure, option values recognize that even though people do not currently use the resource, they still value the option of being able to use it sometime in the future. The Gulf of Maine has an existence value -- even though one may never seriously entertain the possibility of using the resource -- its very existence is something worth preserving. These values are important, even though they may not be easily estimated by dollar value. These values motivate people to support groups like Friends of Casco Bay and others to fight for the preservation and enhancement of the Gulf's resources. Both option and existence values are dependent on the perceived health and wildness of the resource.

Habitats or living resources of national importance.

The Gulf of Maine supports a variety of habitats and living resources of value to the nation. The combined productivity of seaweeds, salt marsh grasses, and phytoplankton is as great as any comparable area in the world, and provides the foundation of the Gulf's biological abundance (p.13, *Gulf* report).

Estuaries, where fresh river water mixes with the salty ocean, are exceedingly productive habitats, serving as an important link in the Gulf ecosystem. Seasonal phytoplankton blooms make estuaries a desirable nursery for the planktonic larvae of many benthic invertebrates such as worms, mollusks, and crustaceans, as well as for juvenile fish. The region's estuaries are thought to be vital at some life stage to about 70% of the fish species of commercial interest along the Gulf coast.

Gulf of Maine waters support a tremendous diversity of marine life and economic activity. These waters are home to at least 1600 different types of bottom-dwelling organisms, about 100 types of birds, 73 different types of fish and 26 different kinds of whales, porpoises and seals (Chap.11-20, *Ecological Characterization of the Coast of Maine*).

This high diversity of sea life is supported by a variety of marine and estuarine habitat types. Salt marshes, eel grass beds, muddy and sandy sediments, gravel beds, rocky substrates, sheltered coves, high energy environments and variable levels of salinity and temperature are all present in Gulf of Maine waters. (Chap.1, *Gulf* report).

The shallow marine subtidal habitat contributes to the productivity of the Gulf ecosystem in several ways. It is home to a variety of macroalgae, including kelp and eel grass; their distribution is dependent on bottom substrate and penetration of sunlight. Marine organisms find food and protection in these seaweed beds. Sea scallops, winter flounder, and lobster, all of commercial importance, are found both in nearshore subtidal areas, as well as along the bottom of offshore waters. Some animals migrate inshore in summer to reproduce in the relatively rich and temperate waters of the shallow subtidal area. Others, such as shrimp, migrate inshore in the winter to reproduce. In the inshore Gulf, cod, haddock, blackback flounder, and other flounders are predominant. In the deep water Gulf, the principal species are American plaice, witch flounder, redfish, white hake, and cusk. In central Georges Bank, cod, haddock, blackback and yellowtail flounders, and pollock are dominant. On the Northeast Peak of Georges Bank, sea scallops are dominant, with seasonal abundances of groundfish such as cod and haddock. Sea herring and menhaden are seasonally abundant throughout the Gulf region, particularly in nearshore waters.

Some fish stocks undertake seasonal movements, crossing the boundary between the United States and Canada. It is estimated that during the summer, 75 percent of the cod, and most of the haddock, are concentrated on the northeastern portion of Georges Bank. However, in the spring and fall, cod are generally distributed all over the Bank. There are distinct spawning stocks of cod, haddock, silver hake, and pollock in the region. Although the Gulf of Maine haddock stock undertakes seasonal movements within the Gulf, it is discrete from the stocks on Georges and Browns Banks.

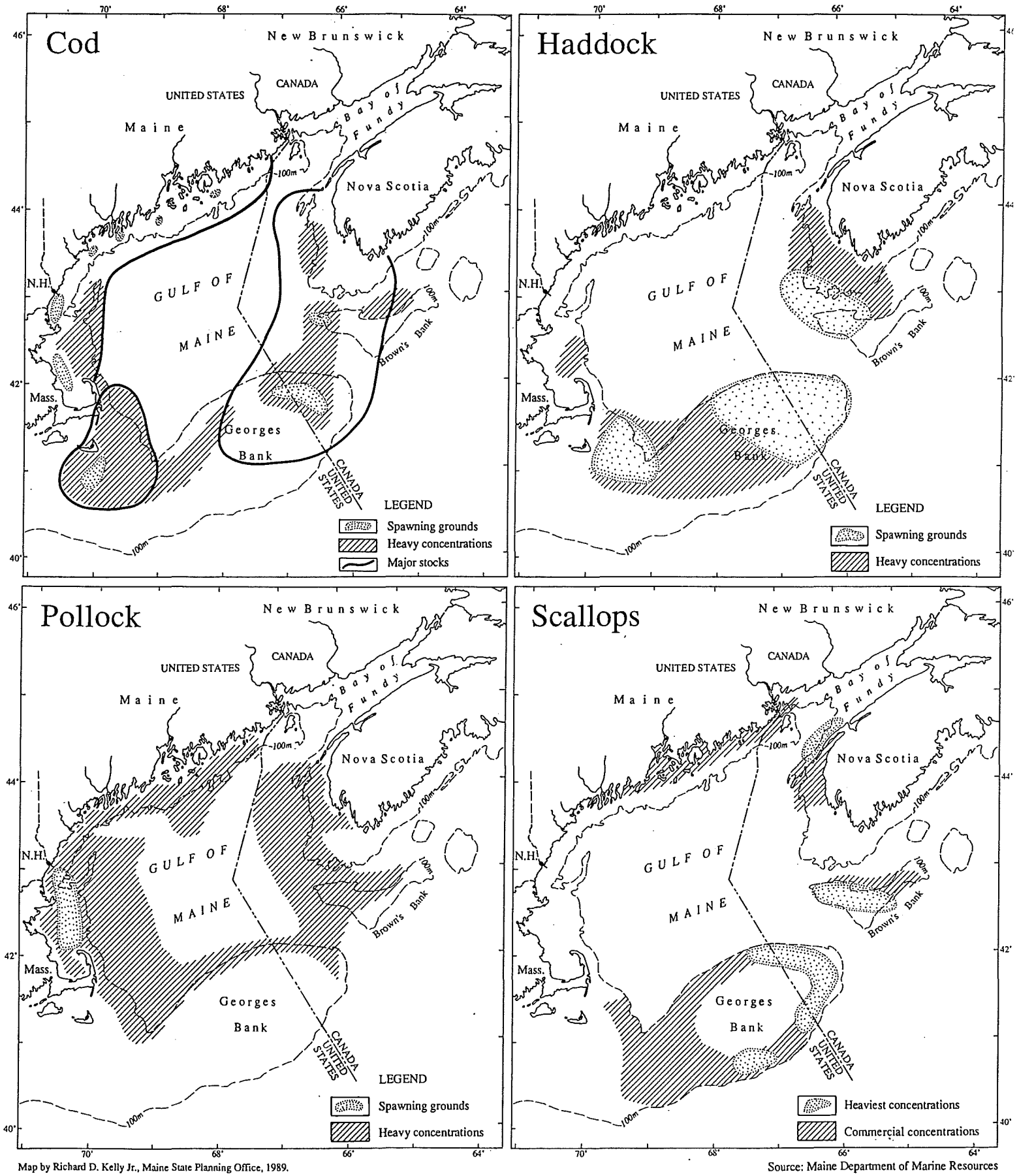
Spawning stocks of herring occur off southwest Nova Scotia, along the coast of Maine, and on Jeffreys Ledge and Nantucket Shoals; a rebuilding stock exists on the northern edge of Georges Bank. These stocks mix and are found throughout the Gulf region at various times of the year. The maps in Figure A illustrate the distribution in the Gulf of Maine of four species of commercial interest (p.18, *Gulf* report).

More than 15 species of federally-protected marine mammals are found in Gulf of Maine waters. Of these, Sei Whale, Right Whale, Finback Whale, Sperm Whale, and Humpback Whale are listed as federally-endangered species. Other endangered species dependent on Gulf of Maine habitats include: Bald Eagle, Peregrine Falcon, Roseate Tern, Least Tern, Piping Plover, Short Nose Sturgeon, Atlantic Ridley Turtle, and Leatherback Turtle.

More than 18 species of marine mammals are present in the Gulf of Maine at some time during the year. Spring is the season of highest abundance for whales, dolphins, and porpoises, coinciding with the period of the greatest annual upwelling in Gulf waters. Georges Bank serves as a major feeding area and nursery, and also as a "refueling" site for some species migrating through to the Gulf of Maine, Bay of Fundy, Scotian Shelf, and other areas. Overall numbers decline in the winter, as many species migrate back to southern breeding grounds.

The Gulf of Maine provides critical habitat for the northern right whale, the most endangered of all the marine mammals found in the region. Between April and July, these animals concentrate around Nantucket Shoals and the Great South Channel, west of Georges Bank, and they are found at the mouth of the Bay of Fundy from late summer into the fall (Catena, 1991).

Figure A



Map by Richard D. Kelly Jr., Maine State Planning Office, 1989.

Source: Maine Department of Marine Resources

The varied habitats of the Gulf of Maine are breeding and feeding grounds for an abundance and diversity of birds. Shorebirds rely on the mudflats and sand beaches of the Gulf as they migrate between their Arctic breeding grounds and southern areas. Sanderlings, semipalmated sandpipers, short-billed dowitchers, and black-bellied plovers are especially common. Great blue herons, osprey, and bald eagles feed and breed in and near the Gulf's estuaries. A Hemispheric Shorebird Reserve has been established at the head of the Bay of Fundy in order to protect habitat for the half million semipalmated sandpipers and other shorebirds that visit the area each year.

The Gulf's shallow subtidal habitat supplies food for diving ducks, including eider, bufflehead, goldeneye, scoter, oldsquaw, and merganser. Most of these ducks spend all but the breeding season along the shores of the Gulf, feeding on small fish and invertebrates. All seabirds breed on coastal islands or protected promontories. Some, like puffin, shearwater, auk, and petrel, live at sea except when breeding.

How can the lessons learned from this estuary be applied to other coastal areas?

Demonstrate the value of the estuary on a national scale and aspects of the program applicable to other coastal/estuarine waters.

National Value --

The Gulf of Maine is a resource of unparalleled value. Its living resources, among the most productive in the world, supported native North Americans and, later, European settlers. Until they were restricted in the 1970s, foreign fishing fleets came from across the world to harvest the abundant supply of fish from Gulf waters. From trawling with highly sophisticated technology to digging clams with a rake, fishing directly supports thousands of the region's inhabitants while fish processing, shipping, selling, and fish preparation supports many hundreds of thousands more.

While fisheries remain the backbone of economic activity in the Gulf, newer, non-consumptive uses of the Gulf's resources are fast growing. Sailing, whale watching, and simply walking on the beach are among the many activities that now attract millions from near and far to the shores of the Gulf, supporting a burgeoning tourist economy in the Gulf region. Aquaculture, the farming of fish and shellfish, has also demonstrated its economic potential in the Gulf, where clean and rich waters provide an ideal environment for the husbandry of marine creatures.

But the Gulf is worth much more than its value in economic terms. Millions are attracted to its shores to live. Recreational opportunities, diverse and beautiful scenery, open space, abundant wildlife, and the sense of a wilderness relatively untrammelled by man all add to the expectional quality of life experienced by residents, whether they live on the shore or not.

Today, evidence is accumulating that the health of the Gulf may be at risk. Pollution, habitat destruction, and overuse of resources pose threats to the ecological integrity of the Gulf, once thought to be immune from degradation. Trace amounts of toxic contaminants have been detected in the deepest parts of the Gulf; some industrialized harbors exhibit exceptionally high levels of contaminants, and lesions associated with contamination have been found in some fish. Throughout the extent of the Gulf's shoreline, sewage pollution has resulted in the closure of thousand of acres of productive shellfish flats; some swimming beaches have also been closed; commercial fish stocks are at an all time low; and several species of wildlife are endangered due to loss of habitat.

Many think of the Gulf as an independent environment unaffected by the land, but in fact, the Gulf and the land that surrounds it are closely linked. The cycle, in which water is evaporated from the surface of the sea, deposited upon the land in the form of snow or rain, and carried back again to the ocean, links the bordering lands and the Gulf. Water returning to the sea carries with it a load of sediment, organic matter, and nutrients. Productivity in the Gulf is greatly enhanced by this introduction of terrestrial nutrients. However, it is the same returning water that carries life-giving nutrients that also frequently ushers in a host of damaging contaminants and wastes generated by human activities. Thus, the health of the Gulf is closely tied to the terrestrial environment that surrounds it on three sides - especially to the activities of those who live and work on its shore.

We know, however, that the Gulf of Maine can be protected. While warning signs of environmental deterioration are evident, much of the Gulf remains healthy. Preventive action will be required to maintain the high environmental quality of the Gulf as well as to reverse trends toward degradation.

Much is already being done to protect and enhance the Gulf environment. Billions of dollars are being invested in expanding and improving sewage treatment. To restore populations of salmon and other fish, millions of smolts are released in the Gulf's estuaries each year and fish ladders are being installed in many dams. Hundreds of volunteers have participated in shoreline clean-up efforts; the Gulf-wide Beach Clean-up will see its fourth year in 1992.

Many are also capitalizing on sound opportunities to benefit from the Gulf's resources: aquaculture and tourism are representative of new and expanded economic activities that thrive on a healthy environment and are prepared to meet the challenge of sustainable development. The future depends on our ability to foster partnerships that bridge the Gulf, to fathom the complexity of its ecosystem, and to mitigate the stresses we impose upon it.

The value of the GOM as an estuary of national importance became apparent to the five bordering jurisdictions in 1989. The stresses that increasing population and intensifying uses had placed on the Gulf of Maine were evident through scientific studies of the Gulf (see *Gulf* report conference proceedings). An international conference held in Portland in December 1989, was attended by over 250 participants, drawn from universities, state, provincial, and federal agencies, marine trade associations, fisheries associations, and private environmental organizations. The participants met in small "work sessions" to examine specific environmental problems in the Gulf and to identify possible responsive actions. The mix of participants and the focused nature of the working sessions resulted in specific lists of actions deemed necessary to meet existing and future problems in the Gulf.

As a result of the conference, development of a Ten-Year Gulf of Maine Action Plan was undertaken. Working together over 18 months the five jurisdictions, as well as representatives of federal agencies in Canada and the United States reached consensus on general goals, objectives, and actions within five priority areas. The Plan reflected public and private studies and plans conducted on particular marine issues. Public review of the draft Action Plan resulted in a final version, approved by the five jurisdictions in 1991 (p.6-7, *Action Plan*).

Applicability to Other Coastal/Estuarine Waters --

The Gulf of Maine, as described in this nomination, encompasses a well-defined marine bio-region. The United Nations Man and the Biosphere Program identified the Gulf of Maine as a unique

water body, citing its high primary productivity and diversity of marine organisms (see *Acadian Boreal Biosphere Reserve Nomination*, 1988).

Figure B below compares estimates of the relative productivity of various shelf areas in the Gulf of Maine to other shelf ecosystems (p.14, *Gulf* report).

Annual Production Estimates for Various Shelf Ecosystems

Trophic Level	Mid- Atlantic Bight	Georges Bank	Gulf of Maine	Scotian Shelf	North Sea	Bering Sea
Primary Production	3,103	3,342	2,566	2,280	2,280	1,824
Zooplankton	357	487	574	411	400	307
Benthos	210	111	98	82	125	149
Fish and Squid						
Early 1960s	32	86	32	34	27	
Early 1970s	25	52	26	21	24	61
		(kcal/m^2)				

Sherman et al, 1988

Figure B

Since 1989, the states and provinces, as well as several federal agencies, have worked to coordinate their research activities in order to improve understanding of the entire ecosystem. This approach is apparent within the Gulf of Maine Marine Environmental Quality Monitoring Plan, approved by the five jurisdictions in 1990. In addition, through the Gulf of Maine Action Plan, regional networks of environmental managers and policy-makers have begun to confer on enhanced coordination activities. By focusing on the Gulf of Maine as an integrated natural system which recognizes no political boundaries, the states and provinces have pursued an integrated management and research program which may be emulated in other shared water bodies, such as the Bering Sea or the Great Lakes.

Perhaps the most important feature of Gulf of Maine efforts has been the preventative approach taken by the bordering jurisdictions. The Gulf of Maine Action Plan makes clear that preventing additional deterioration of the marine environment shall be the primary focus of compatible actions taken under the Plan (p.1 & 6, *Action Plan*). While stresses on the marine environment exist, the Gulf of Maine remains a healthy system (p.10, *Toxic Contamination in the Gulf of Maine*; p.55, *Gulf* report). Proactive marine research and monitoring activities and the inter-regional management efforts underway may provide the tools for other, as yet healthy, marine systems to use.

NEED FOR THE CONFERENCE

What is the importance of the estuary on a local or regional scale?

Value on a local or regional scale.

The Gulf of Maine fisheries are a regional and local resource as well as a national resource. The Gulf of Maine supports nearly 20,000 U.S. and Canadian fishermen with landings in 1988 that totaled 1.2 billion pounds and value at approximately $650 million (U.S.) (*Gulf* report). The fishing industry supports many more people than just the fishermen themselves; almost an equal number work at fish processing jobs. Thousands of others are employed building and repairing boats, selling fuel and supplies, and buying and selling fish. In some communities along the southwest coast of Nova Scotia, approximately 75% of the population is directly dependent on commercial fishing. The annual value of the fishing industry to the regional economy is as much as three times the value of the fish landed -- approximately two billion dollars (p.21, *Gulf* report).

Tourism is a major contributor to state, provincial and national economies. Tourist dollars are an important source of revenue to coastal towns, many of which have shifted from fishing-based to tourism-based economies. The tourism industry on Cape Code alone accounted for $1.5 billion (U.S.) in 1985, representing 75% of the Cape's economy (p.25, *Gulf* report). (Figure C)

Tourism in the Gulf Of Maine

	# Non-resident *Tourists/Year*	Tourist Expenditures *(millions)*	Direct+Indirect *# Jobs*
Massachusetts	22.6 million (State)	$4,210 [1]	88,000+
New Hampshire	2.11 million (coast)	$334.2 (coast)	53,500 (state)
Maine	6.3 million [2]	$920 (coast)	57,600
New Brunswick	2.5 million	$38 (Fundy region)	19,200
Nova Scotia	1.2 million [3]	$280.9 (Fundy region)	12,900

1. Includes Barnstable County, Middlesex County, and Boston/Cambridge area; state total for direct tourist expenditures was $6.2 billion in 1987.
2. State total, August 1984-July 1985.
3. May- October only (province total, non-residents).

Sources: Massachusetts Department of Tourism; *Boston Globe*, May 1987; University of New Hampshire, Department of Leisure Management & Tourism; Maine Department of Tourism; *New Brunswick Tourism Statistics Manual*; Nova Scotia Department of Tourism & Culture.

Figure C

Recreational fishing is popular in the Gulf of Maine and generates significant economic activity. The fishery in New Brunswick and Nova Scotia is largely for Atlantic salmon caught in coastal rivers. New Brunswick estimates this fishery, along its Bay of Fundy shore, to be worth three to five million Canadian dollars each year. In the New England states there were at least 9 million recreational saltwater fishing trips made in 1985. These trips resulted in an estimated catch of more than six million fish in Maine, one half million in New Hampshire, and over 15 million in Massachusetts. The principal species caught were mackerel and cod, as well as flounder, pollock, and bluefish. Massachusetts estimates that nearly 790,000 saltwater fishermen spent $803 million (U.S.) in the state in 1987 (p.23, *Gulf* report).

The Gulf of Maine is also valued for its ability to assimilate wastes--sewage, industrial effluent, air pollutants, and urban and other runoff. The commercial value of ocean disposal has not been calculated for the Gulf region. If current trends continue, we can be sure that the burden on the Gulf of Maine to assimilate waste and non-point source pollution will increase. The coastal zone is being developed more rapidly than interior sections and a movement in the region's state and provincial economies towards service industries will result in greater relience on automobiles which means more roads and parking lots, among other contributors to non-point source pollution. For more on this see Colgan, Charles, Waste Disposal Issues in the Gulf of Maine in *The Value of the Gulf of Maine.*

Gulf waters are used to transport residents and visitors to islands and mainland towns in the region. Figure D below summarizes the value of cargo traffic (imports and exports) in major ports of the Gulf of Maine (p.26, *Gulf* report).

Cargo Traffic in the Major Ports in the Gulf of Maine

Total Cargo (Imports + Exports)
million short tons (metric tons)

	Petroleum & Fuel Oils	% of Total	Dry Cargo	Total
Boston	18.4 (16.7)	87%	2.7 (2.5)	21.1 (19.2)
Portsmouth	1.5 (1.3)	43%	2.0 (1.8)	3.5 (3.1)
Maine[1]	11.1 (10.1)	93%	0.86 (0.78)	12.0 (11.0)
Saint John	12.6 (11.4)	77%	3.9 (3.5)	16.4 (14.9)

1. Maine ports include Portland, Searsport, Eastport, Winterport, and Bucksport. Portland handles the dominant share of petroleum cargo traffic; Searsport and Bucksport have lesser roles.

Sources: U.S. Army Corps of Engineers; Maine DOT; Massport, Boston; Saint John Port Authority; Statistics Canada.

Figure D

Support for the Gulf of Maine Program will result in an increased economic value of the resource in two primary ways. First of all, increased monitoring will result in greater predictability in industries wholly dependent on biological resources. One of the difficulties with the fishing industry in the Gulf of Maine is the unpredictability of fisheries landings, "driven mostly by the biology of the Gulf itself" (from Wilson, James, Fisheries of the Gulf of Maine and Living Marine Resources in *The Value of the Gulf of Maine*, 1988). Increased environmental quality monitoring combined with Gulf wide availability of useful data will allow greater predictability of fish stocks and thus increase the ability of the fishing industry to capitalize on the fisheries.

Secondly, the Gulf of Maine Program seeks to improve the environmental quality of the Gulf of Maine through implementation of its Action Plan. Improved environmental quality is sure to result in increased economic value in a number of ways: value of the living resources, value to tourists, property values along the coast, recreational opportunities, and option and existence values. For more information on this see *The Value of the Gulf of Maine* (1988).

What are the major environmental problems facing the estuary?

Human-induced stresses on the Gulf affect public and environmental health, aesthetic and recreational enjoyment, and economic well-being in several, primarily coastal, regions of the Gulf; the potential for even broader impacts is great. To understand and manage the impact of such stresses on the health of the Gulf ecosystem requires accurate understanding of the nature, scale, and impact of environmental perturbations in the Gulf. As a step toward generating the requisite information, the Gulf of Maine Council on the Marine Environment has established a tightly focused and pragmatic environmental quality monitoring plan for the Gulf of Maine (Reference: Gulf of Maine Environmental Quality Monitoring Program: An Initial Plan). The plan is summarized after the following synopsis of known cause and effect relationships between the environmental problems described in the previous chapter and a variety of causes.

Toxicants --

In 1971, 5,000 gallons of jet fuel were spilled in an intertidal cove in Penobscot Bay; five years later, 65 acres of clam flats remained devoid of clams. In 1976, bunker C oil spilled from the Argo Merchant southeast of Cape Cod resulted in 20 to 98 per cent mortality in cod eggs sampled near the spill; samples of surviving cod and, particularly pollock embryos, displayed genetic damage and evidence of developmental abnormalities. Pesticides were responsible for increased larval mortality in ten species of fish in the southwestern Gulf, in areas receiving runoff from cranberry bogs and marshes treated for mosquito control. Such episodes of acute contamination and impact are relatively infrequent and localized in the Gulf of Maine.

The greatest threat to the health of the Gulf of Maine (even considering a catastrophic oil spill) is from the long term effects of the widespread and continuing introduction of small and seemingly insignificant quantities of persistent toxic materials to marine waters. As a first step towards determining the impact of contaminants on the marine environment, data are frequently collected on the accumulation of toxins in the tissues of organisms. As with sediments, however, such data do not provide information on the impact of contaminants. Existing data indicate that the highest contaminant concentrations in the

Gulf occur in coastal embayments and nearshore waters that border urban and industrial areas and where major sources of runoff, such as rivers, reach the marine environment. Evidence exists of the sublethal effects of chronic pollution; for example, in Boston Harbor, fin rot and liver disease are prevalent in flounder and shell rot is widespread in lobster. However, it is not possible to determine the exact cause of these problems.

Concentrations of polycyclic aromatic hydrocarbons (PAHs) in some nearshore areas of the Gulf of Maine are comparable to much more heavily industrialized areas. PAHs also occur in trace amounts in the deep water basins of the offshore Gulf of Maine; offshore transport of fine sediments and associated organic particles, and direct deposition of airborne PAHs most likely account for their appearance in these remote habitats. In a survey of over 170 sites throughout the coastal U.S., sediments at a Boston Harbor site exhibited the highest concentrations of PAHs. Five other sites from the Gulf of Maine were within the top twenty two most contaminated sites for PAHs.

A similar pattern is apparent for metals. Salem Harbor, which receives wastes discharged from several tanneries, had the highest concentration of chromium of 170 sites sampled in the coastal U.S. Boston Harbor sediments contained the highest levels reported for antimony, silver, and tin. Gulf of Maine sites ranked within the top ten sites for ten of the twelve metals examined. Analyses of sediment cores from Boston Harbor and Massachusetts Bay indicate that metal contamination has increased dramatically since 1900. Data from Jeffreys Basin indicate that it may be an offshore depositional area; metal concentrations are equivalent to those found closer inshore. In 1984, Casco Bay recorded the highest levels of lead, the third highest levels of silver, and the fifth highest level of zinc in fish livers in a survey of contaminants in United States fish. Elevated metal concentrations were detected in mussels from Penobscot Bay in the late 1970s, and again in the late 1980s.

Tributlytin is a complex of tin and organic compounds. An anti-fouling agent used to treat boat hulls, the use of tributyltin is now restricted because of its extreme toxicity to non-target organisms such as shellfish. Levels of tributyltin as high as 500 parts per billion, as high as any observed worldwide, have been detected in Boston Harbor sediments.

In 1984, years after a near total ban on the use of DDT in North America, livers of fish sampled in Boston and Salem Harbors contained significant concentrations of DDE, the primary form of DDT in environmental samples. Boston Harbor samples contained nearly twice the level of pesticides found in any other site in the United States. DDT, Dieldrin, and other pesticides have been detected in the eggs of seabirds from Canadian nesting colonies. Since these birds feed over wide ranges of the Gulf and are near the top of the food chain, pesticide levels in their tissues most likely represent Gulf-wide trends rather than local conditions in the vicinity of the colonies.

PCBs, also banned in North America, are found in tissues at concentrations greater than those of chlorinated pesticides by an order of magnitude or more. A survey of the sediments of the deepwater basins of the Gulf revealed polychlorinated biphenyls (PCBs) present in at least trace quantities at all sites. One site in Boston Harbor had the highest level of PCBs of 170 sites sampled nationwide. Declines in the levels of PCB in the eggs of seabirds have been evident since 1972. This same decreasing trend was noted even near highly contaminated sites in Massachusetts. The reverse trend was observed in mussel tissues from Penobscot Bay. Levels of PCBs in mussels taken from Sears Island in 1986 were more than twice the level of those taken at the same site ten years earlier. Elevated concentrations of PCBs have been measured in lobster and flounder from Quincy Bay, in Massachusetts.

Elevated levels of chlorinated dioxins have been detected in fish from the Androscoggin River and in herring gull eggs from the Bay of Fundy.

Warnings from public health agencies against consumption of marine organisms are indications of the potential impact of contamination. Several such warnings are in effect in the Gulf of Maine. In addition to numerous warnings against eating shellfish contaminated with bacteria and the red tide organism, PAH concentrations in the tomalley of lobsters from Quincy Bay warrant a consumption 'advisory. Fish from Maine's Androscoggin River have accumulated chlorinated dioxins; fishermen are warned to limit the number of fish they consume from the river. In 1989, limitations on consumption of shellfish from the Piscataqua River, on the Maine-New Hampshire border, were recommended due to lead contamination from a nearby toxic waste dump.

Pathogens --

Bacterial contamination has resulted in extensive prohibitions on the harvesting of shellfish from Gulf mudflats. Roughly 60,000 acres of productive acreage are under harvesting restrictions. The majority of closures can be attributed to point sources, including sewage treatment plants, residential discharges, storm water runoff and boat anchorages.

Swimming is prohibited at several beaches in the Gulf region. On any given day during the summer, approximately 30% of Boston Harbor beaches are closed to swimming. In Maine, in 1988, swimming standards were exceeded for the first time at some beaches; in 1989, the Annapolis Basin, in Nova Scotia, was also closed to swimming.

Eutrophication --

Eutrophication may play a role in the incidence of toxic "tides," including red tide, which results in the closure of thousands of acres of clam flats each summer.

In 1988, a bloom of a toxic marine alga, Gymnodinium nagasakiense, in the upper reaches of Casco Bay caused a major die-off of lobsters, clams, worms, and other benthic organisms. While nutrient runoff has been blamed for the bloom, few data exist to substantiate the claim.

Habitat Loss/Modification --

The cumulative impact of development near and on the shore has affected breeding and feeding grounds for many species of wildlife. For example, only 300 pairs of piping plovers remain in the Gulf of Maine; almost half of the worldwide population.

As sea level continues to rise, shoreline will retreat landward. The most conspicuous changes will occur along easily eroded and low-lying coasts: sedimentary bluffs, beaches, salt marshes, and flood zones, exacerbating the impacts of development activities on the upland.

Habitat loss and impairment, along with overharvesting, has dramatically affected populations of diadromous fish, including salmon, sturgeon, striped bass, eels, shad, and alewives, which spend portions of their life cycles in both the sea and fresh waters. Damming of rivers throughout the Gulf region to generate electricity and create impoundments blocks passage to vital habitat. Chlorine, used to disinfect domestic wastewater, can be highly toxic to marine fish and shellfish, particularly juvenile stages. Several species have been shown to exhibit avoidance behavior at chlorine concentrations so low they are nearly undetectable. Fish returning to their natal rivers may be deflected by trace amounts of chlorine

discharged from municipal sewage treatment facilities. Acid rain also affects diadromous fish; the pH of nine river systems in Nova Scotia has declined since 1955 to the point where Atlantic salmon cannot reproduce successfully.

Tidal power stations alter the tidal range of the water body behind the impoundment resulting in a reduction in extent of mudflats, which are important feeding areas for birds and fish and spawning areas for fish. The tidal power plant that currently operates on the Annapolis River in Nova Scotia has affected local current patterns, caused upstream riverbank erosion, killed fish passing through the turbines, altered the natural deposition of sediments, and influenced the soft shell clam fishery in the Annapolis Basin. The proposed Minas Basin project (in the upper Bay of Fundy) could result in an increase in tidal range along the length of the Gulf coast, eroding upland and modifying currents and mixing characteristics throughout the Gulf.

Of eight whale species encountered in the Gulf of Maine, five (humpback, fin, right, sei, and sperm) are endangered. The Gulf of Maine is critical habitat for the northern right whale; the 300 individuals that frequent the Gulf represent the entire world population of this species. A recent study of the right whale reported that 35% of right whale deaths resulted from collisions with vessels and entanglement with fishing gear.

What is known about cause/effect relationships and how do you propose to better identify the causes of environmental problems?

Evidence of cause/effect relationship; summary of problems, changes, probably causes.

Changes in Living Resources --

Overexploitation has drastically altered fish stocks in the deep water portions of the Gulf of Maine and on Georges Bank. Total biomass, which by 1981 had declined from a maximum of seven million metric tons to approximately three to three and a half million metric tons, has continued in a downward trend. Cod stocks have declined 50% in the last decade. Although other factors, including long-term shifts in temperature, may also affect fish stocks, the decrease is most marked for species of commercial value, indicating that fishing is likely responsible for the change. The decline in commercial species has resulted in a change in the relative abundance of fish in the Gulf. In the 1960s surveys of fish stocks demonstrated that redfish and haddock were the most abundant species, comprising 28% and 12.2% of the weight per sampling tow. Abundance of these species declined in the 1980s to 7% for redfish and 4.8% for haddock. Meanwhile dogfish rose to 23.2% and hake to 17.5% of the weight per tow.

Total biomass on Georges Bank declined in the late sixties as European and Asian fleets exploited a broad array of species on the Bank. Stocks recovered briefly when the efforts of distant water fleets were restricted in 1977; however, an increase in U.S. and Canadian fishing effort has lead to a second decline. Dogfish and skates now represent about 70% of the total Georges Bank finfish biomass.

Along with the changes in biomass and species composition there have been changes in the age structure of various finfish stocks in the Gulf of Maine. A striking example of the change in age structure is the witch flounder. In 1980, there were fish as old as 22; by 1985, the oldest fish were 20 and there were no three year olds; in 1987, the age classes only included fish from 5 to 18 years old.

Exploitation can also lead to the replacement of one species by another. For example, the increase in the sand launce population, evident in recent years, may have been made possible because its more efficient competitors and/or predators (herring and mackerel) were decimated by the distant water fleets during the 1960s.

Cumulative impact --

Cumulative impact may explain ecological changes for which there is no apparent single cause. For example, five years of sampling indicates that, for unknown reasons, sea scallops from deepwater sites in the Gulf of Maine are nutritionally deficient and lack the glycogen reserves necessary for spawning. These populations apparently are not reproducing themselves.

Unusual algal blooms may also indicate that the marine ecosystem is out of balance. Blooms of the red tide organism and other toxic algal species are of concern not only for their impact on shellfisheries but because they may be symptomatic of environmental stress. In 1989, red tide reached sufficiently high concentrations on Georges Bank to require limitations on the harvest of shellfish.

Changes in quality of life --

Environmental degradation diminishes the quality of life of the region's residents. Oil slicks and industrial and sewage outfalls make boating and other recreational uses of coastal waters unappealing. Recreational fishing and shellfishing are severely impacted in the Gulf's coastal communities by sewage contamination and population declines.

One effect of intense growth in coastal regions is the littering of the shores and marine waters that results from increased use of the coastal region. Non-biodegradable trash, especially plastics, is one form of marine pollution that is readily visible. Floating and submerged debris and shoreline litter also presents hazards to boaters, fishermen, and beachwalkers.

Strategy for measuring effects of controls identified, to be shared with other estuary managers.

The Gulf of Maine Council on the Marine Environment has identified assessment of the health of the Gulf as of pressing importance. The Council initiated development of a monitoring plan as a first step toward improving environmental management of the Gulf, envisioning a program that will allow evaluation of environmental quality of the Gulf while improving the effectiveness of prevention and remediation efforts.

The monitoring plan is based on a mission statement provided by the Council:

> It is the mission of the Gulf of Maine Marine Environmental Quality Monitoring Program to provide environmental and resource managers with information to support sustainable use of the Gulf, and allow assessment and management of risk to public and environmental health from current and potential threats.

Three monitoring goals were established:

- To provide information on the status, trends, and sources of risks to the marine environment in the Gulf of Maine.

- To provide information on status, trends, and sources of marine-based human health risks in the Gulf of Maine.
- To provide appropriate and timely information to environmental and resource managers that will allow both efficient and effective management action and evaluation of such action.

To narrow the scope of the monitoring plan the objectives were ranked in order of importance; the plan was developed to address only the top two objectives:

1) To assess the status and trends in the marine environment by monitoring appropriate indicators, especially those that will allow early identification of change in environmental quality.

2) To assess the existing levels, the trends, sources, and economic impacts of acute and chronic risks to human health from toxic compounds transmitted through marine foods and water contact.

Implementation of the plan was initiated in 1991 with a Gulf-wide pilot monitoring project using mussels as indicators of ecosystem health. The pilot project serves to integrate several ongoing projects with the monitoring goals developed in the plan and addresses a regional management issue of general interest in the Gulf of Maine.

What are the institutional arrangement for the estuary and how are they working?

Evaluation of institutional structures (laws, programs, management programs).

Jurisdictional authority in the Gulf of Maine is shared by myriad state, provincial, regional, and federal agencies. In the United States, federal law confers to the states title to and ownership of the lands lying beneath navigable waers and the natural resources therein, to three miles offshore. The waters beyond three miles to the limits of the Exclusive Economic Zone (200 miles) belong to and are governed by the federal government. The federal government also retains primary authority over certain activities within state waters for the constitutional purposes of commerce, navigation, national defense, international affairs, and environmental protection.

Key U.S. laws include the Coastal Zone Management Act; the National Environmental Policy Act; the Ocean Dumping Act; The Clean Water Act; the Oil Spill Pollution Act of 1990; federal marine sanctuary and estuarine reserve programs; and federal protections for wildlife established under the Endangered Species Act, the Marine Mammal Protection Act, and other federal programs.

Within the three states, key programs include Maine's unique shoreland zoning and land use planning requirements; land use commissions with planning and regulatory authority within the coastal areas of Maine and Massachusetts; Maine and New Hampshire regulatory authority over large-scale development; Massachusetts' special environmental impact reporting requirements; Massachusetts' program for providing extensive public benefits for the private use of tidelands and submerged lands; and Massachusetts' ocean sanctuaries program.

Collectively, the three states also implement state and estuarine water classification systems; licensing standards for sewage treatment plants and point source discharges; oil spill and hazardous waste laws; nonpoint source management plans; wetland standards; development restrictions within

coastal dunes and bluffs; regulation of underwater archeological resources; critical area programs; endangered species laws; and open space acquisition programs.

In Canada, offshore exploitation rights and legislative jurisdiction of the federal and provincial governments regarding marine resources are still somewhat unsettled. The Canadian Constitution delegates to the federal government control over navigation, shipping, fisheries, and matters related to peace, order, and good government. The provinces generally manage local and private matters, civil rights, property and the regulation of natural resources and hydro-electricity. Since the Canadian Constitution does not explicitly delegate environmental protection to either level of government, both the federal government and the provinces exert some control over coastal resources. In some cases jurisdictional agreements have been executed to regulate specific resources, such as the Canada-Nova Scotia Offshore Protection Resources Accord, under which resource management and revenues were shared for offshore hydrocarbon exploitation. Most noteworthy is that both provinces are considering the establishment of Coastal Zone Management mechanisms.

Key Canadian federal laws include the Fisheries Act; the Canadian Environmental Protection Act; the Canada Shipping Act; the Oil and Gas Production and Conservation Assessment and Review Process Guidelines Order; and the National Parks Act.

In Canada, neither Nova Scotia nor New Brunswick have enacted comprehensive coastal zone management legislation, although both provinces address coastal development and planning through general planning legislation and environmental impact assessment requirements. Point sources of pollution are controlled through enviornmental and water protection legislation, and sewage disposal is regulated through public health legislation. Both provinces provide financial assistance to municipalities wishing to construct sewage treatment works. Although neither province has legislation specifically addressing nonpoint source pollution, both provinces regulate pest control products that may enter into water courses.

The two provinces also enforce laws related to hazardous waste management, offshore oil and gas development, transportation of dangerous goods, conservation of coastal areas, aquaculture, beach mining, protecting critical areas, and leasing and permitting requirements exerted through crown lands legislation. For more complete descriptions of the above-mentioned laws and related programs, refer to Appendices A through D within the Gulf of Maine report, *Assessing U.S. and Canadian Laws and Programs*, produced in 1992 by the Marine Law Institute and the Oceans Institute of Canada.

Identify gaps and inconsistencies; assess how well regulations are enforced and whether programs are being coordinated.

The recently produced review of the Gulf legal regime indicated that there are areas where gaps in regulatory coverage do exist. Figure E illustrates topic areas where Canadian and U.S. marine management approaches differ.

Regulatory standards vary substantially within state and provincial programs. Individual states and provinces have unique policies and programs to protect and preserve coastal and marine resources within their jurisdiction. Figure F illustrates contrasting programs related to the Gulf of Maine in effect in the three states and two provinces.

Figure 1
Common and Divergent Approaches for Managing the Marine and Coastal Environment

Approaches	U.S.	Canada
Environmental Impact Assessment	X	X
Ocean Dumping Regulation	X	X
Oil Spill/Hazardous Wastes	X	X
Offshore Oil and Gas	X	X
Open Space Programs	X	X
Endangered Species Protection	X	X
Aquaculture Regulation	X	X
Point Source Pollution Control	X	X
Marine Debris Programs	X	X
Coastal Management Programs	X	
Water Quality Standards	X	
Primary/Secondary Sewage Treatment	X	
NPS Pollution Programs	X	
Wetland and Sand Dune Regulation	X	
Marine/Estuarine Protected Areas	X	
Environmental Data Coordination		X

Figure E

Figure 2
Contrasting Policies for Regulating Gulf of Maine Resources

Approaches	ME	NH	MA	NS	NB
Shoreland Zoning	X				
Comprehensive Planning	X				X
Large-Scale Site Review	X	X			
Land Use Commissions	X		X		
Statutory Coastal Policies	X				
State/Provincial EIR/EIAs			X	X	X
Vessel Discharge Prohibitions		X			
Marina Pump-Out Requirements	X		X		
Marine Monitoring Programs	X				
Overboard Discharges Prohibited		X	X	X	
CSO Policies			X		
Waste Oil Recycling			X		
Sedimentation Controls	X	X			
Toxic Use Reduction Laws	X	X			
Offshore Mining Standards		X			
Small-Scale Wetland Protection		X	X		
Sea Level Rise Mapping			X		
Wetland Buffers	X		X		
Sea Wall Prohibitions	X		X		
Tidal/Submerged Lands Benefits	X		X		
Underwater Archeology Programs		X	X		
Ocean Sanctuaries			X		
Endangered Habitat Protection	X		X		X
Critical Area Standards			X		

Figure F

For a complete discussion of the contrasts among federal laws, and state and provincial laws, refer to Chapters 2 and 3 of *Assessing U.S. and Canadian Laws and Programs* (1992).

As a result of this scrutiny of the Gulf legal regime, certain recommendations are under consideration by the states and provinces. The following are among the most significant recommendations:

- to implement consistent wetland protection standards and mitigation policies;
- to encourage an environmental assessment process for projects, programs and policies with potential significant transboundary environmental impacts;
- to examine enforcement and compliance with environmental laws and to encourage consistent policies (pp.29-37, *Assessing U.S. and Canadian Laws and Programs*).

The states and provinces recognize that it is incumbent upon them to take the initiative to address these recommendations in a timely fashion.

LIKELIHOOD OF SUCCESS

What goals and objectives do you propose to set for the estuary and how do you propose to meet them?

List the overall goals planned to be proposed to the management conference.

The overall goal in nominating the Gulf of Maine as an estuary of national significance is to ensure full and effective implementation of the Gulf of Maine Action Plan. The Action Plan is the product of steady negotiation among state and provincial officials, federal agency staff, and members of the public. It represents the consensus of involved parties regarding priority goals, objectives and actions in the Gulf of Maine.

The Plan is divided into five sections: Monitoring and Research; Coastal and Marine Pollution; Habitat Protection; Public Education and Participation; Protection of Public Health. Aggregation of the multiple issues raised at the 1989 Gulf of Maine conference resulted in these five issue categories. As such, the goal given in each section reflects the chief environmental issues identified at that conference.

The five jurisdictions articulate in the Action Plan their vision for the Gulf: "to maintain and enhance marine environmental quality in the Gulf of Maine and to allow for sustainable resource use by existing and future generations" (p.10, *Action Plan*). Each section contains a single goal, followed by objectives and then the actions which all parties agree to pursue. The Action Plan section goals are as follows:

- Monitoring and Research: to obtain and make available information required by resource managers to sustain the Gulf of Maine ecosystem.
- Coastal and Marine Pollution: to reduce impacts from existing pollution sources and to prevent future environmental degradation of the Gulf of Maine.
- Habitat Protection: to foster an integrated approach to protection and sustainable use of Gulf of Maine habitats.
- Public Education and Participation: to cultivate a sense of stewardship among the citizens of the Gulf region and to enable them to make responsible decisions regarding Gulf of Maine resource use.
- Protection of Public Health: to minimize public health risks from use of Gulf of Maine natural resources.

Objectives are established on the basis of preferred uses, standards, and permit activities.

Given the size of the Gulf and the multiple interests represented in development of the Action Plan, it is not surprising that twenty objectives and several dozen actions are contained within the Plan.

In order to further hone the task before them, the states and provinces clustered the twenty objectives into three categories: those to begin in 1991-1993, those to begin in 1994-1997, and those to begin in 1997-2000.

During the past year, the states and provinces, with the assistance of several Canadian and U.S. federal agencies, initiated actions to meet priority objectives of the Action Plan. These activities include design and construction of a regional data and information management system (Objective 1.1, p.13, *Action Plan*); development of an inventory of point-source discharges within the Gulf of Maine region (Objective 2.1, p.18, *Action Plan*); a wetlands change mapping project, in cooperation with the U.S. Fish and Wildlife Service (Objective 3.1, p.24, *Action Plan*); and initiation of a regional citizens' education and participation program (Objective 4.1, p.28, *Action Plan*). The tasks within the annual work plan are developed on a consensus basis and all parties agree to pursue their appropriate responsibilities.

Action plans should be proposed to address the environmental and institutional problems identified in the problem state.

Each state and province operates under different legislative mandates and political conditions, thus approaches to the Action Plan objectives will differ. The policy of the states and provinces is to allow flexibility among jurisdictions regarding fulfillment of the objectives. In essence, the states and provinces agree that they will all achieve the objectives; the methods chosen to pursue the objectives are up to themselves. Given agreed-upon priorities and regular communication among all parties, this policy has been remarkably successful so far.

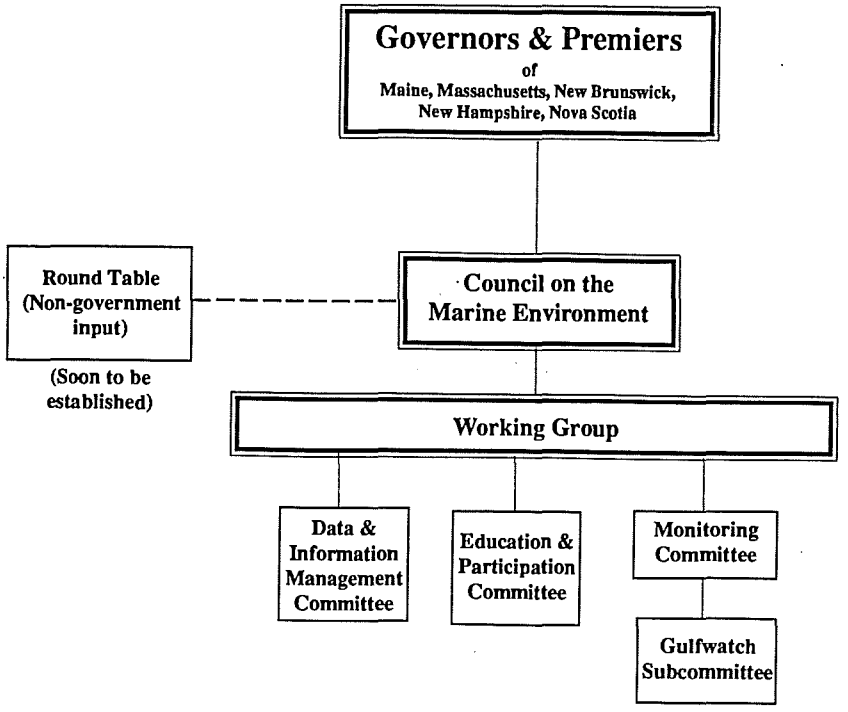
Who will participate in the management conference and how will it be organized?

Management conference membership is the EPA administrator, representatives of state, local, and foreign governments, other appropriate regional agencies, affected industries, educational institutions, and the general public.

Currently one body focuses solely on Gulf of Maine issues, as mandated by the region's governors and premiers -- the Council on the Marine Environment. The Council was established through the *Agreement on the Conservation of the Marine Environment of the Gulf of Maine*, signed in December, 1989. Each governor and premier appoints two individuals to sit on the Council. Federal agencies have observor status on the Council. The Council could serve as the foundation of the management conference. The chart in Figure G illustrates the organization of the Gulf of Maine Program.

In addition to the Council, the Program is convening a Standing Gulf Roundtable comprised of users of the coastal, estuarine and marine environment. Through the Council's three Standing Committees, educational organizations are involved as are all levels of government. Finally, each state and province has an effective public involvement mechanism. In some instances we might seek to expand these to include broader public participation in Gulf-wide activities.

Gulf of Maine Program Organizational Chart



February, 1992
Figure G

The conference must include scientific, technical, and citizen advisory committees.

The management arm of the Council is a body known as the Gulf of Maine Working Group. Unlike the Council, active membership on the Working Group is open to state, provincial, and regional entities, as well as federal agencies. Currently, the Working Group comprises representatives from:

State/Provincial:
- Nova Scotia Department of Fisheries
- Nova Scotia Department of the Environment
- New Brunswick Department of the Environment
- New Brunswick Department of Fisheries and Aquaculture
- Maine State Planning Office, Coastal Program
- Maine Department of Environmental Protection
- New Hampshire State Planning Office, Coastal Program
- New Hampshire Department of Environmental Services
- Massachusetts Executive Office of Environmental Affairs, Coastal Program

Federal:	U.S. Environmental Protection Agency National Oceanic and Atmospheric Administration U.S. Fish and Wildlife Service Environment Canada Canadian Department of Fisheries and Oceans
Regional:	Council of Maritime Premiers, Land Registration and Information Service

The Working Group meets on average five times each year. Members are responsible for development of Council Annual Work Plan and Budget, strategic planning following Action Plan priorities, public outreach, and interaction with appropriate private and public organizations.

Recognizing that research and monitoring needs underlie many of the objectives of the Action Plan, the states and provinces created a Monitoring Committee. The Monitoring Committee oversees implementation of the Marine Environmental Quality Monitoring Plan, as well as a regional monitoring plan pilot project known as Gulfwatch. The Committee enjoys representation from public agencies and universities from throughout the region, as well as federal agency representation. This committee, or some expanded format, could serve as the Gulf of Maine Technical Advisory Committee.

An Education and Participation Committee was created in 1991 to guide development of a regional education program. The committee, comprised of public and private individuals, recently held a regional educators and communicators workshop to solicit comments on the content of such a program, as well as to lay the groundwork for a regional educational affiliates network. This committee could serve as the Gulf of Maine Public Advisory Committee.

Harkening to the clearly expressed need among managers and scientists for improved management of the many databases existing in the region, the states and provinces created a Data and Information Management Committee in 1990. The Data and Information Management Committee is charged with the design and creation of a regional information management system which would allow users to access marine databases throughout the region. They have worked with the research community on establishing data management protocols to ensure the generation of new data is in a format that is compatible with the management system. The Committee, which has federal, state, provincial, and academic representation, plans to have a prototype system active by the close of 1992. The expertise available in the Data and Information Management Committee should be invaluable in performing data management functions, as per National Estuary Program requirements.

Since 1989, environmental organizations, marine trade associations, and other sectors of the Gulf of Maine public have been involved in the development and implementation of the Gulf Action Plan. At the 1989 Gulf conference, participants helped form the foundation for the Action Plan. Mid-way in the creation of the Plan, a draft was sent out to a wide variety of individuals and organizations within the region for review and comments, which were then incorporated in the final version of the Plan. Now in the first year of implementation of the Plan, the states and provinces recognize that there is a need for sustained input from the private sector, to assist in execution of the Plan as well as to suggest improvements in its content. Therefore the Council on the Marine Environment agreed in 1991 to expand its membership to private individuals and to create a Gulf of Maine Round Table.

The Round Table, scheduled to meet late in 1992, will serve as an advisory group to the Council. This body will meet four to six times a year and will contain representatives from major user groups. In this way citizen involvement will be assured at the policy-making level as well as the management levels.

What are the state or local governments and public and private institutions already doing for the estuary?

Past water quality planning efforts.

In the 1970s and 1980s, the New England River Basin Commission, created under provisions of the Water Resources Planning Act of 1965, developed a series of river basin reports in coordination with state and federal agencies and regional planning commissions. The series included summary reports on each of the coastal watersheds of the three states bordering the Gulf of Maine. The reports summarized existing water resource information and identified management problems in order to facilitate regional planning. These reports remain a source of valuable information for coastal watershed and estuarine planning.

Traditional Clean Water Act programs.

The U.S. Federal Water Pollution Control Act, more commonly known as the Clean Water Act, establishes effluent limitations and standards for specific industrial dischargers, licenses discharges through the NPDES permit program and funds the construction of publicly-owned sewage treatment works. Each of the three states has a municipal grants program to fund the cost of pollution abatement and sewage treatment plant construction.

The states of Massachusetts, Maine and New Hampshire have adopted comprehensive water pollution control laws that comply with the intent of the Clean Water Act. The laws generally prohibit unlicensed discharges from point sources and establish a permitting system for discharges with limitations on pollutants. The three states have established water classification schemes for all inland and marine waters and systems for monitoring water quality. Each state in the Gulf region issues biennial Water Quality Assessment Report (305(b) reports) that detail existing water quality in navigable waters, water quality trends, and status of water quality programs.

Massachusetts, Maine and New Hampshire have adopted Nonpoint Source (NPS) Management Plans to comply with section 319 of the Clean Water Act. The plans list priority waters threatened or impaired by NPS pollution, identify priority categories of NPS pollution, define best management practices for each category and outline a strategy for implementation of a nonpoint source pollution prevention program.

In Canada, point source discharges are controlled under the federal Fisheries Act and the Environmental Protection Act. Canada does not require primary or secondary treatment of sewage, however, the provinces do provide funding for construction of publicly-owned sewage treatment works. Nonpoint source discharges are not specifically addressed under Canadian law. The federal

Canadian government limits phosphorus in detergent and prohibits the application of certain pesticides in an effort to protect environmental quality.

For more information on federal, state, and provincial laws, regulations, and programs in effect in the Gulf of Maine region refer to the report, *Assessing U.S. and Canadian Laws and Programs (1992).*

Problems associated with existing federal programs.

Problems with existing federal programs in each state are magnified on the regional level. A major impetus for the initiation of the current Gulf of Maine Program was the recognition that environmental quality issues concerning the Gulf of Maine would gain from increased coordination and cooperation. The report, *Assessing U.S. and Canadian Laws and Programs Affecting the Marine and Coastal Environment of the Gulf of Maine* (1992) examines problems with existing laws and programs and presents recommendation for improvements on a regional scale.

Estuary management pursuant to other federal statutes.

Within the Gulf region, a number of similar coastal and marine programs are underway, supported by state, provincial, and federal agencies. Within Canada, the Annapolis River estuary, Saint John harbor, and the St. Croix River estuary are sites included in the new Atlantic Coastal Action Plan. In the three sites, user groups are meeting with municipal, provincial, and federal officials to devise a management plan for the individual estuary. The federally-funded program will provide at least $50,000 (Can) to each site over a five-year period and is patterned on the US National Estuary Program.

The St. Croix River has been the subject of joint planning efforts by New Brunswick and Maine for several years. Nominated as a Heritage River System in Canada and as a protected Class A River in Maine, the two jurisdictions signed an agreement in 1988 creating the St. Croix International Waterway Commission, and charged the Commission with development of a joint management plan for this boundary water. The Plan, completed in 1990, calls for recognition of the St. Croix as an International Heritage Waterway River and for specific water quality measures to be pursued by both jurisdictions

Two National Estuarine Research Reserve sites are located within the Gulf of Maine: the Wells Estuarine Research Reserve in southern Maine and the Great Bay Estuarine Research Reserve in New Hampshire. These sites were established by the National Oceanic and Atmospheric Administration which provides fund for education, research and acquisition. Each reserve conducts strong education and outreach programs which have successfully developed public awareness of Gulf coastal resources. The Wells Reserve operates an Estuarine Discovery Program in eight grade schools in southern Maine; the Great Bay Reserve has a growing volunteer monitoring program underway, supervised by New Hampshire Sea Grant and the Jackson Estuarine Laboratory. The Sea Grant Programs operated within the states also provide critical marine research and public education services.

Massachusetts Bay and Casco Bay have been designated National Estuaries as part of EPA's National Estuary Program. The Governors from Maine and Massachusetts have demonstrated the support of state government for two existing NEP projects in the Gulf since 1990.

Recently, Stellwagon Bank off the shores of Massachusetts was designated a National Marine Sanctuary, as part of NOAA's Marine Sanctuary Program.

Maine, Massachusetts, and New Hampshire have Coastal Programs established under the federal Coastal Zone Management Act. Each program receives federal and state funding to pursue coastal land and water use planning initiatives consistent with their policies and plans. The three programs are "networked." They rely on a network of laws and regulations implemented by a number of state agencies and coordinated by a non-regulatory coastal management program.

New federal water quality initiatives.

Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 requires each state with a federally approved coastal zone management program to develop an submit to NOAA and EPA for approval, a Coastal Nonpoint Source Pollution Control Program (CNPCP). The CNPCP will be an update of existing state coastal zone and section 319 nonpoint source programs. The three states within the boundary of the Gulf of Maine region will be developing CNPCP's that provide for implementation of management measures that are consistent with guidance developed by EPA and other federal agencies. The guidance will include a range of methods and measures for quantifying and reducing nonpoint source pollution in coastal watersheds. States must adopt coastal NPS programs within 30 months of the publication of final EPA guidelines (in summer 1992) or risk loss of CZMA section 306 funding.

After 1992, the Clean Water Act will require federal permits for stormwater discharges into storm sewers and reduction of pollution from combined sewer outfalls. Each of the states is currently addressing stormwater issues through the funding of improvements to combined sewer overflows. In cooperation with EPA Region I, the three gulf states are revising toxic pollution control strategies that require periodic chronic toxicity tests of municipal wastewater treatment facility effluent.

State and regional programs.

The states and provinces recognized in 1989 the need to coordinate activities within the Gulf, and formalized that commitment with the 1989 **Gulf Agreement**. The **Gulf Agreement** commits the five jurisdictions to discuss and act upon environmental "issues of common concern" and to "minimize actions that would result in degradation of environmental quality or depletion of resources that individually or cumulatively could result in significant adverse impacts on resources," among other items (See **Gulf Agreement**, 1989).

Numerous monitoring programs are underway in the Gulf. A selection of these programs includes the Boston Harbor Monitoring Program; the National Water Quality Data Bank, Environment Canada; NOAA's Marine Resources Monitoring, Assessment, and Prediction; and the U.S. Geologic Survey Water Resources Data Program. In addition, NOAA's Status and Trends Program monitors Gulf coastal waters from Maine to Cape Cod.

The states have water quality classification programs that meet or exceed the federal standards. For example, the state of Maine includes biological criteria as well as the federal fishable and swimmable standards. Maine, New Hampshire and Massachusetts are members of the New England Interstate Water Pollution Control Commission which coordinates interstate water pollution control efforts, standards, and water quality testing as well as providing training and certification programs for wastewater treatment plant operators.

Involvement by universities and private institutions.

In 1990, the states and provinces, working with the Urban Harbors Institute in Massachusetts and the Association for Research on the Gulf of Maine, convened a Gulf of Maine Science Conference. The conference focused on natural variability in the Gulf. The Science Conference, which was attended by scientists and environmental managers from around the region, concluded with a summary of specific research needs.

The Gulf of Maine region supports more than 65 public and private institutions committed to the study of the Gulf of Maine marine ecosystems and coastal management. The Association for Research on the Gulf of Maine (ARGO-Maine) coordinates scientific research on the Gulf of Maine and operates a research vessel. The Bigelow Laboratory for Ocean Science and Darling Center, in Maine, the Woods Hole Oceanographic Institution in Massachusetts, the Huntsman Marine Science Center in New Brunswick, the Jackson Estuarine Lab in New Hampshire, and Oceans Institute of Canada and Center for Marine Geology in Nova Scotia, are all actively conducting research in Gulf waters.

Massachusetts, New Hampshire and Maine support Sea Grant Programs that promote wise use of marine and estuarine resources through volunteer water quality monitoring programs, extension efforts and support of marine-related research. For a complete listing and description of research and educational organizations in the Gulf of Maine, refer to pages 7-22 of *Gulf-Links: A Resource Guide to Coastal Organizations in the Gulf of Maine Region* (1991).

Is there public and political will, as well as financial capability, to support implementation of the CCMP?

Demonstration of political will and commitment.

The political will to support ongoing efforts in the Gulf is strong. The Maritime provinces and the New England states have a pattern of working together that has existed for many decades. The 1989 *Gulf Agreement* provides another avenue for compatible action on the Gulf. Through that document, the governors and premiers agree to "the development of additional agreements or protocols on speicific issues or concerns that may be raised from time to time" (*Gulf Agreement*, 1989). The Agreement was but one further indication of the ability of the region's leaders to work collaboratively. Most importantly the Agreement called for:

- the establishment of the Gulf of Maine Council on the Marine Environment -- a state/provincial institutional mechanism appointed by the Governors and Premiers that coordinates and sets policy for the Gulf Program; and
- the development of a ten-year natural resources action plan that describes cooperative actions the region will pursue to further the Program's goals of pollution prevention and sustainable development.

In response to the federal Marine Research Act of 1991 the Governors promptly pursued formation of the Gulf of Maine Marine Research Board. Their initiative distinguishes them from the other ten marine regions in the country, as no other region currently has a Board established and a draft Research Priorities Plan completed.

State Agencies --

Through the Gulf of Maine Program we have demonstrated the commitment of the region's state agencies to participate in a coordinated marine ecosystem management initiative. More specifically, through the Working Group and various committees of the Council we have effectively involved more than 11 state agencies in different aspects of the Gulf Program.

Federal Agencies --

Four U.S. federal agencies have joined the state and provinces in working collaboratively on the priorities in the Action Plan. These agencies (NOAA, ACE, EPA, USF&W) have committed staff and financial resources to projects that involve their mandates in the coastal and marine environment. In Canada, Fisheries and Oceans and Environment Canada have made similiar commitments.

Gulf Users --

Recently, the Gulf Program has made a more concerted effort to involve the many users of the Gulf's environment in a targeted manner. Examples of this approach include:

- the Program is designing a marine debris collection and recycling pilot project in coordination with fishermen in Nova Scotia and Maine;
- a workshop was held to share information on the environmental impacts of aquaculture on the marine environment. Participants in the workshop included state and federal regulators, aquacultualists, and interested members of the public.

Documentation of ability to generate public support.

In 1988, the Portland Press Herald ran a week-long series of articles on the status of the Gulf of Maine. Since the mid-1980's, the Boston Globe has printed articles on Boston harbor and its laborious clean-up. In 1989, the Saint John Telegraph Journal printed a week-long series of articles on the status of the Bay of Fundy (see articles in Appendix). All of the newspaper articles were alarming. These stories reflected the concern that the public, in particularly those members whose living is derived from the Gulf of Maine, for the **long-term health** of the Gulf.

The public voiced its concern during a series of field hearings conducted by George Mitchell in the region during 1989. At those hearings, representatives from environmental organizations,

fishing organizations, universities, and public agencies spoke of their growing sense of anxiety regarding the health of the Gulf ecosystem (see Mitchell hearings, 1989).

This public concern was clearly expressed at the 1989 Gulf of Maine Conference in Portland, Maine. During the conference participants heard dozens of technical papers that documented growing indications of environmental change: thousands of acres of closed shellfish, beaches closed to swimming, toxic algae blooms growing in size and distribution annually, incidents of extreme eutrophication in coves and harbors, changes in species composition on Georges Bank, toxic sediments in deep offshore basins.

Public Support --

The Gulf of Maine region, particularly in the three New England states, has a long tradition of public support for environmental initiatives. The public is generally aware of the significance of the Gulf to region's economy and quality of life. Consequently obtaining their continued support for wise management is assured. Through the Gulf Program major initiatives are underway to substantially increased public participation in environmental issues and to foster a greater appreciation that the public has a critical role to play in managing the Gulf.

- The Governors and Premiers are poised to expand the Council's membership to include five private members -- bringing the Council's total membership to 15. This presents a major opportunity for the private sector to help shape public decisions affecting the Gulf.
- The Gulf Program's Public Education and Participation Committee, comprised of public and private people from throughout the region, will present a public awareness strategy for adoption by the Council in July, 1992. One of their mandates is to establish a recognizable identity for the Gulf with the areas residents -- as was done so successfully in the Chesapeeke Bay region. The Committee is developing a mutli-year strategy to involve the public and it should be approved by the Council in July, 1992.
- The Council is pursuing the formation of a Gulf of Maine Round Table comprised of 25 individuals from the private sector. This group will be responsible for reviewing Council activities and formulating a gulf-wide sustainable development strategy.
- The Council has sponsored a Gulf-wide shoreline cleanup for the past three years which allows local residents to take an active role in the stewardship of local resources. Several thousand people have participated.

In Canada, the 1991 *State of the Environment report*, produced by Environment Canada, noted adverse changes in the marine environment of the Gulf of Maine/Bay of Fundy system. These changes were abundantly clear to citizens of the region, who in 1991 banded together as a citizen advocacy group to address them. Known as "Coastal Convergence", the organization staged a three-day community meeting in St. Andrews, New Brunswick, to define existing environmental problems in the Bay of Fundy, pinpoint responsible agencies and industries, and consolidate a clear Action Plan for presentation to provincial and federal agencies. "Coastal Convergence" was one of the entities that provided extensive comments on the draft Gulf of Maine Action Plan.

Documentation of financial capability to support implementation of the CCMP.

When the Gulf of Maine Program was initated in 1989 the states and provinces, at the direction of the Governors and Premiers, made significant staff and financial contributions. During the intervening years the State and Provinces have commited in excess of $300,000 each year in support of the Program. Given the rotating nature of the Secretariat and the duties assigned to it, Maine and New Brunswick have made the greatest financial commitment.

It is anticipated that the financial and staff commitment by the participating agencies will increase -- not diminish. Since this level of commitment exceeds the 25% matching commitment required by the NEP we foresee no problem in meeting EPA's matching requirements.

Demonstration of state's ability to meet the expense of implementing the action plans.

The Governors and Premiers are committed to the goals and objectives of the Gulf Program. They have demonstrated this support by directing state agency participation in many of the Program's components (e.g., data information and management, environmental monitoring, etc.) as well as allocating in excess of $300,000/year.

Recently the Council has also looked to private sources for technical and financial contributions. *Funding the Gulf of Maine Program* is a 1990 publication that describes private funding opportunities for the Program to pursue.

Within the past six months the five Community Foundations in the U.S. and two in the Provinces have initiated formal discussions as to how they can assist the Program in securing the financial resources required. They have committed $30,000 and are preparing plans for a $500,000 request to the philanthropic community.

Should include a commitment to develop a strategy within two years to pay for implementation costs (either strategy is already developed, or application includes types of financing plans it will consider).

During the past three years, the States and Provinces have demonstrated their commitment to follow through on their agreed-upon goals, pursuant to the *Gulf Agreement.* With regard to funding of the actions identified in the CCMP, we expect there will be a mix of funding sources including state, provincial, federal (U.S. and Canadian), corporations and private philantrophic interests. Given the current state and provincial efforts in this area, the strategy for implementation of additional actions, required by the CCMP, should be easily accomplished within the two year time frame.

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