PENOBSCOT BAY
Maine

National Estuary Program
Nomination

March 1995

STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04333

ANGUS S. KING, JR.
GOVERNOR

March 6, 1995

Administrator Carol Browner
U.S. Environmental Protection Agency
401 M. Street, S.W.
Washington, D.C. 20460

Dear Ms. Browner:

I am pleased to submit a State of Maine Conference Agreement that nominates Penobscot Bay for designation in the National Estuary Program. The Agreement describes the Bay's key issues and actions to respond to them, how we will continue to involve the public in developing and implementing solutions to these most pressing issues, and how we propose to finance this estuary project.

Our nomination for Penobscot Bay is consistent with EPA's December, 1994 guidance that calls for considerable initiative by a state before requesting designation. Public and private entities have worked cooperatively since 1992 and made remarkable progress. Two major conferences have brought together all levels of government, the nonprofit community, Bay businesses and the public to talk openly about key issues and possible solutions. These and other activities described in the attached document have laid a solid foundation for a successful national estuary project.

I believe our estuary project will be successfully implemented because of the active participation of five state agencies over the past three years. These agencies (the Departments of Environmental Protection, Marine Resources, Inland Fisheries and Wildlife, Economic and Community Development, and the State Planning Office) are committed to this project and I am confident that in concert with our nonprofit, municipal and business partners we will make important strides to protect and restore Penobscot Bay. Our combined enthusiasm and financial support will ensure that we successfully meet and likely exceed the Program's 25% matching requirement.

Penobscot Bay is a national treasure in which Maine places great value. We look forward to working with EPA in developing and implementing a comprehensive plan for it.

Sincerely,

Angus S. King, Jr.
Governor

cc: Darrell Brown, Oceans and Coastal Protection Division, EPA
Ed Woo, Marine and Estuarine Protection Section, EPA

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for

Penobscot Bay Network

March 1995

Table of Contents

Page

Introduction

This proposal, developed by the Penobscot Bay Network, nominates Penobscot Bay for inclusion in the National Estuary Program. Penobscot Bay hosts some of Maine's most significant coastal wildlife habitat; its rich, marine waters support a diverse fishing industry; and its scenic beauty and recreational value make it a traditional destination for Eastern vacationers.

But, Penobscot Bay is not without its problems. Water quality problems have closed substantial portions of the Bay to shellfish harvesting. Pockets of toxic contamination exist. Continued development, recreational pressures and intensive fishing practices threaten essential wildlife and marine resource habitat. A decline in manufacturing jobs and regulations effecting the offshore commercial fishing sector require a shift to development of sustainable industries; industries that rely on a viable, clean ecosystem.

This proposal outlines how the National Estuary Program can help focus efforts to resolve the major problems facing Penobscot Bay and support new initiatives. This proposal tracks the guidelines developed by EPA to facilitate evaluation and designation. A draft conference agreement also is attached. Finally, appendices are included when necessary.

National Estuary Program Nomination of Penobscot Bay

I. Geographic Scope of Penobscot Bay

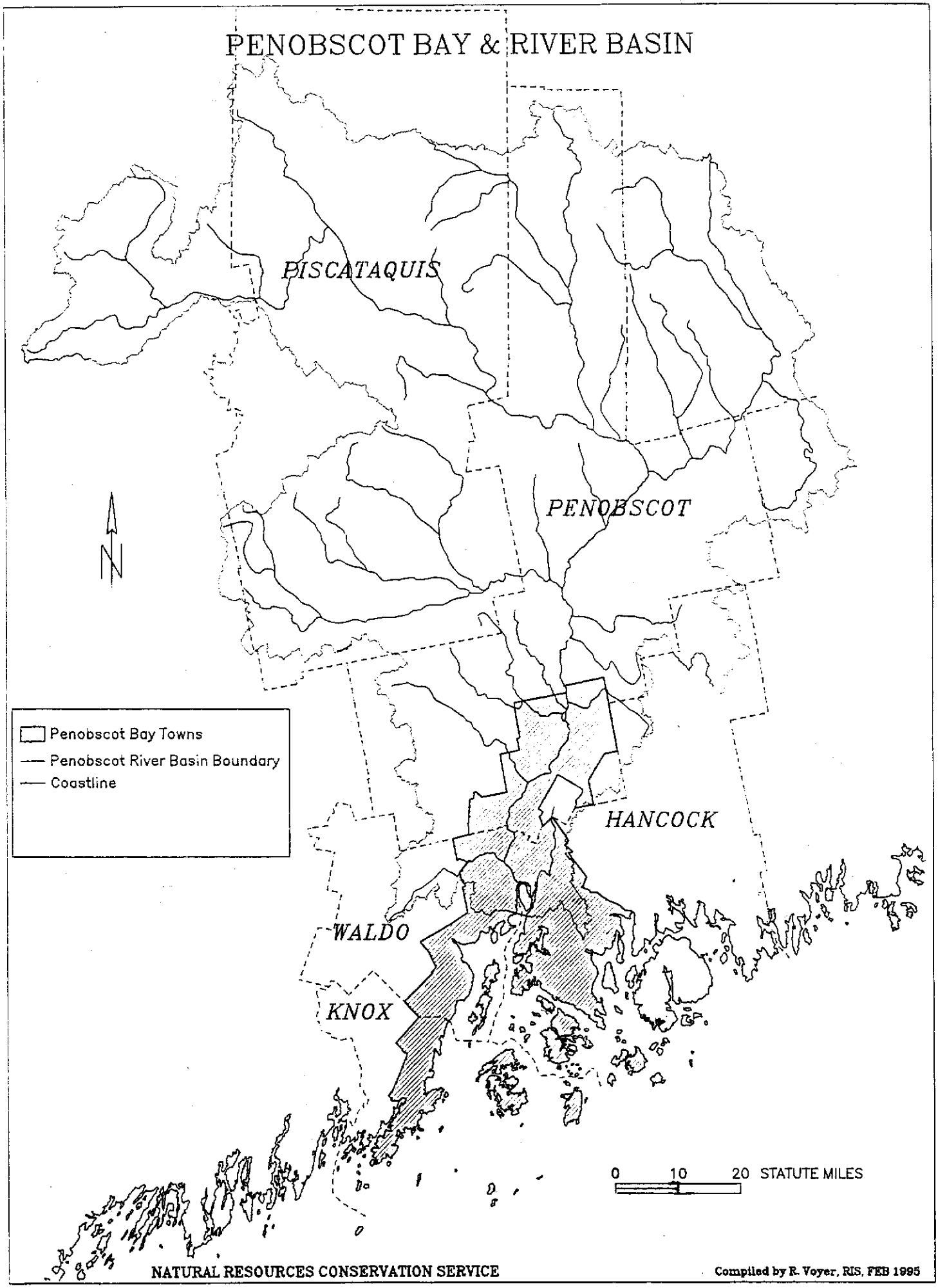
1. The Bay is Open to Sea and Divided by Salt-water

Penobscot Bay is Maine's largest bay, encompassing almost one third of the State's total coastline. Shaped like an elongated triangle, Penobscot Bay is over 45 miles wide at its mouth and 37 miles long. The oceanward boundary of the bay can be defined by the seaward extent of the Penobscot River's influence on water quality and aquatic life. This boundary is roughly defined by a line running from Swan's Island, to the east, to Matinicus Rock and on to Marshall Point, to the west. Tidal influence extends inland to head-of-tide at the Veazie Dam; tidal range at Bangor is about 6.5 feet. Tidal range at Searsport is 9.9 feet. Relatively shallow, Penobscot Bay covers an estimated 1,070 square miles (684,585 acres); submerged land accounts for 89% of the Bay's area, the remainder is comprised of 1,700 islands, rocks and ledges. The Bay has over 1,200 miles of shoreline (including island shoreline). (The Penobscot Bay Conference Proceedings, 1993; Island Institute memo, 3/30/94; UMO, 1993; USDOT/FHA & MDOT, 1987).

The Penobscot Estuary from Bangor to Sears Island is a partially mixed, or moderately stratified, estuary. This means that the fresh water inflow from the river runs over the salt water coming in from the Bay and forms a layered water column with significant changes in salinity and temperature with depth. Salt water is denser than the fresh water and in the summer is also colder resulting in stratification of the Bay with the fresh water overlying the salt water. In certain areas, these layers are mixed eddy currents. The stratification is also affected by seasonal changes in temperature and river runoff as well as the daily tidal currents that move the entire system back and forth. The Coriolis effect, caused by the spinning of the earth on its axis, causes the majority of the fresh and salt water mixed in the areas above Sears Island to flow along the western shore of the Bay between Sears Island and Turtle Head on Islesboro. The majority of the incoming salt water flows along the eastern shore between Castine and Turtle Head. (MMA, undated). Salt water reaches as far upriver as Hampden (UMO, 1993).

2. Why the Boundaries of the Proposed Study Area do not Encompass the Watershed

As measured by the historic height of migration of anadromous fish, the Penobscot estuary extends several hundred miles inland; the watershed draining into the estuary, so defined, covers nearly one quarter of the State (see Figure 1). With the exception of educational activities, the efforts of the project will focus on the coastal communities surrounding the bay and estuarine portion of the river; the study area includes Old Town, Milford and the Penobscot Nation because

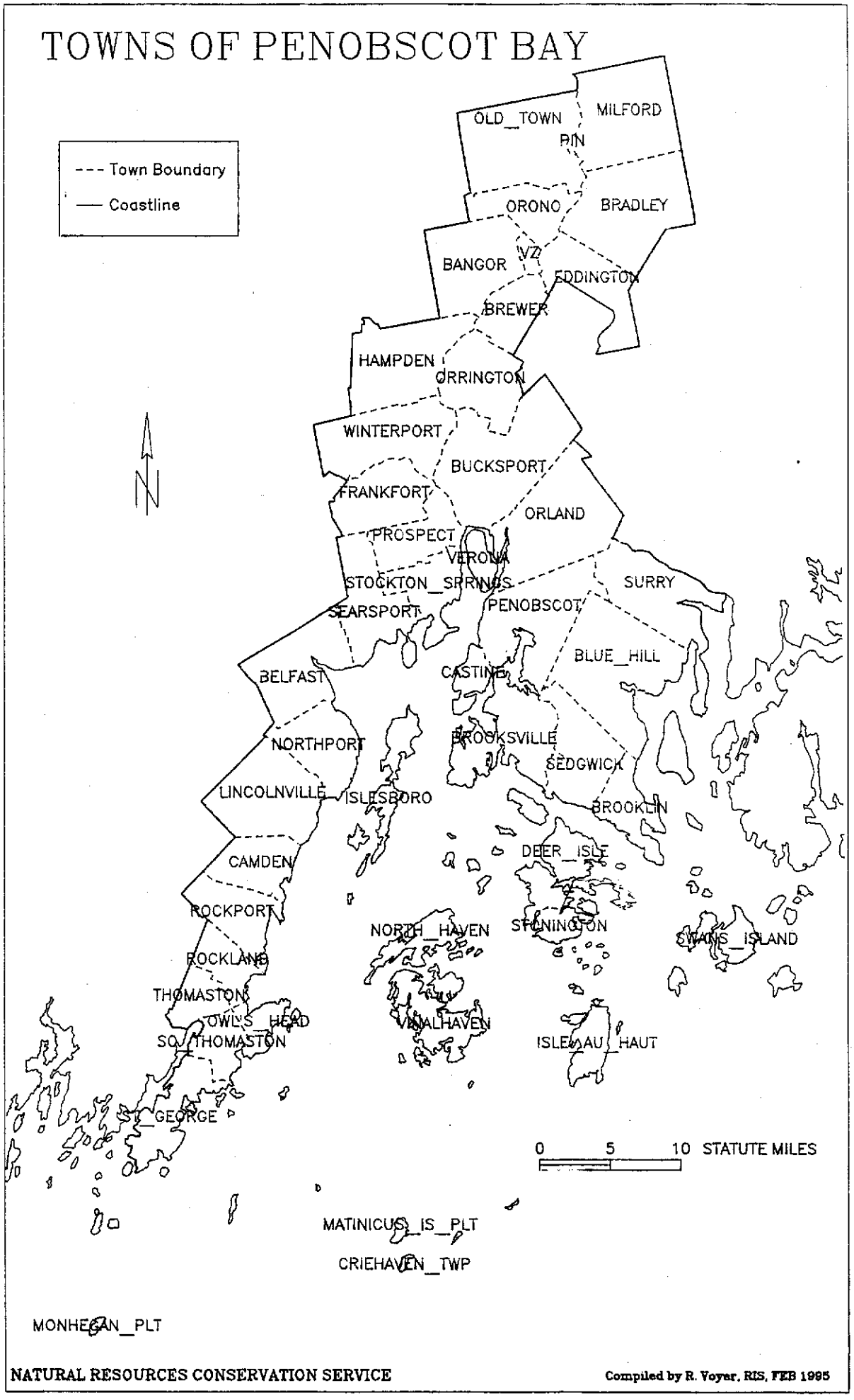

PENOBSCOT BAY & RIVER BASIN
PISCATAQUIS
PENOBSCOT
HANCOCK
WALDO
KNOX
N
Penobscot Bay Towns
Penobscot River Basin Boundary
Coastline
0 10 20 STATUTE MILES
NATURAL RESOURCES CONSERVATION SERVICE
Compiled by R. Voyer, RIS, FEB 1995

this area is a known source of bacterial contamination which may contaminate the Bay. These jurisdictions are listed in Table 1 and a map of the study area is included in Figure 2.

The study area does not encompass the entire watershed for the following reasons: 1) it is estimated that the greatest threats to the Bay are in the coastal areas in the Bay's immediate watershed; 2) with the exception of the coastal communities, the watershed is very sparsely populated; 3) the watershed is split between areas of the State governed by municipalities and unorganized areas overseen by Maine's Land Use Regulation Commission posing jurisdictional problems for the project; 4) the State's point and nonpoint source programs are addressing many of the issues which an NEP would address in the interior portions of the watershed; 5) the size of the watershed poses problems of scale for a new initiative; and 6) additional areas can be included in the NEP as the Management Conference proceeds and additions are deemed necessary.

Table 1.
Jurisdictions included in the study area.

St. George	Vinalhaven	Prospect
South Thomaston	Isle Au Haut	Frankfort
Owls Head	Stonington	Bucksport
Thomaston	Swan's Island	Winterport
Rockland	Deer Isle	Hampden
Rockport	Brooklin	Orrington
Monhegan	Sedgwick	Brewer
Matinicus	Brooksville	Bangor
Criehaven	Castine	Veazie
Camden	Blue Hill	Eddington
Lincolnville	Surry	Orono
Northport	Penobscot	Bradley
Belfast	Orland	Old Town
Searsport	Verona	Milford
Isleboro	Stockton Springs	Penobscot Nation
North Haven		


TOWNS OF PENOBSCOT BAY
--- Town Boundary
— Coastline
OLD_TOWN
MILFORD
PIN
ORONO
BRADLEY
BANGOR
VZ
EDDINGTON
BREWER
HAMPDEN
ORRINGTON
WINTERPORT
BUCKSPORT
FRANKFORT
ORLAND
PROSPECT
VEROLA
STOCKTON_SPRINGS
SURRY
SEARSPORT
PENOBSCOT
BLUE_HILL
BELFAST
CASTINE
NORTHPORT
BROOKSVILLE
SEDGWICK
LINCOLNVILLE
ISLESBORO
BROOKLIN
CAMDEN
DEER_ISLE
ROCKPORT
NORTH_HAVEN
STONINGTON
SWANS_ISLAND
ROCKLAND
THOMASTON
OWLS_HEAD
VINALHAVEN
SO_THOMASTON
ISLE_AU_HAUT
ST_GEORGE
0 5 10 STATUTE MILES
MATINICUS_IS_PLT
CRIEHAVEN_TWP
MONHEGAN_PLT
NATURAL RESOURCES CONSERVATION SERVICE
Compiled by R. Voyer, RIS, FEB 1995

3. Penobscot Bay Region Drainage Area, Wetland Acreage, Tributaries and Land Use

The bay area is a geologically young landscape formed during the last ice age which ended about 12,000 years ago. Surrounding uplands include the highest mountains on the eastern seaboard: Megunticook on the west and the Mount Desert Range just beyond the Bay's eastern limit. Like the rest of the Maine coast, the Bay is a "drowned" coastline whose islands are the tops of ice-scraped hills (Bass and Houtman, 1994).

The physical oceanography of the estuary and the larger Gulf of Maine are closely interconnected; seasonal run off from the estuary helps to drive the large scale currents that dominate the Gulf of Maine. The Penobscot is one of 7 estuaries, listed in Table 2, contributing an average of over 70 m^3/second annually to the Gulf. Changes in temperature and salinity in the Gulf are felt, in turn, in the estuary (Gulf of Maine Council on the Marine Environment, 1992).

Table 2.
Rivers contributing an average of over 70 m^3/second annually to the Gulf

Merrimack Saco Androscoggin Kennebec	Penobscot St. Croix Saint John

Penobscot Bay is influenced by a distinct maritime climate. Annual precipitation (49") is higher than any other region of Maine and fog is frequent (Annette Naegel memo, undated). During the summer months visibility is limited to four miles or less approximately 30 to 50% of daylight hours. The mean annual temperature is approximately 45° with a normal yearly range of 40°. January and February are the coldest months with temperatures averaging 23° to 27°; July is the warmest month with a mean temperature of approximately 65°. On average, five months of each year are entirely frost free (USDOT/FHA & MDOT, 1987).

As part of the Penobscot Watershed, the Bay is a component of the second largest estuary system in New England. Extending over 400 miles from the rivers headwaters near the Quebec border to the Gulf of Maine, the Penobscot River and its tributaries drain over 9,140 square miles of upland. (The Penobscot Bay Conference Proceedings, 1993). The area directly draining into the estuary totals 3,160 square miles (Island Institute memo, 3/30/94).

The main stem of the Penobscot River was designated as an "A" river by the Maine Rivers Study in 1982, signifying that the river is a natural and recreational resource with greater than state

significance. The designation was based on the Penobscot's critical ecological resources, its anadromous fisheries, and its historic significance in the colonization, development and industrial growth of Maine.

The Bay includes 7,500 acres of intertidal mudflats and 1,000 acres of salt marsh (IF&W, 1987). Freshwater wetlands include bogs, upland and riverine swamps and marshes. No areal extent figures are available, but on the basis of soil types, about one third of the watershed is estimated to be wetland. Significant wetland areas include floodplains along rivers and streams, the Caribou and Sunkhaze bogs north of Old Town, and the black spruce peatland known as the Klondike in Baxter State Park (UMO, 1993).

Based on 1990 census data, about 180,000 people live in the watershed. Ninety five percent of the watershed is forested; much of this is actively managed forest land. In 1987, agriculture in Penobscot, Piscataquis, Waldo and Hancock Counties accounted for land use on 1.1% (65,725 acres) of the watershed. Hay accounted for 86% of crop acreage with corn and potatoes contributing most of the remainder. Urban areas include Millinocket, East Millinocket, Mattawamkeag, Lincoln, Dover-Foxcroft, Milo, Old Town, Orono, Veazie, Bangor, Brewer, Bucksport, Searsport, Belfast, and Rockland.

The four major tributaries of the Penobscot, each draining greater than 500 square miles, are the East Branch, the West Branch, Mattawamkeag River, and the Piscataquis River (DEP, 1994). The Sebec and Passadumkeag Rivers are lesser tributaries (New England River Basin Commission, 1981). The Passagassawakeag River drains 91 square miles and drains directly into Penobscot Bay at Belfast (State Planning Office, 1991). The Duck Trap River also drains directly to Penobscot Bay at Lincolnville.

4. Map of the Penobscot Bay Estuary and Proposed Project Boundaries

Figure 2 defines the boundaries of the proposed Penobscot Bay National Estuary Project. The landward boundaries of the proposed project are the municipal boundaries of the coastal and riverside towns up to Old Town and Milford. The seaward boundary is roughly defined by a line running from Swan's Island to the east, to Matinicus Rock and on to Marshall Point to the west. This corresponds to the oceanward extent of the Penobscot River's influence on water quality and aquatic life.

II. Estuarine Values

1. Recreational Uses of Penobscot Bay

Penobscot Bay is a recreational haven that has been eulogized in countless songs, poems and stories. The mountains near shore offer hiking and sweeping scenic views, while the bay and islands offer boating, sport-fishing, kayaking, camping, cruising, sailing, hunting, and a chance to explore an unknown cove. The waters of Penobscot Bay are among the world's most famous sailing grounds and a fleet of restored 19th century windjammers carry visitors on week-long Bay cruises. The numerous islands of the Bay, with the backdrop of mountains, creates a visual treat that will be long-remembered by those who pass through. The region also offers a wealth of opportunities for bird-, seal- and whale-watching

A. Open Space and Recreational Land

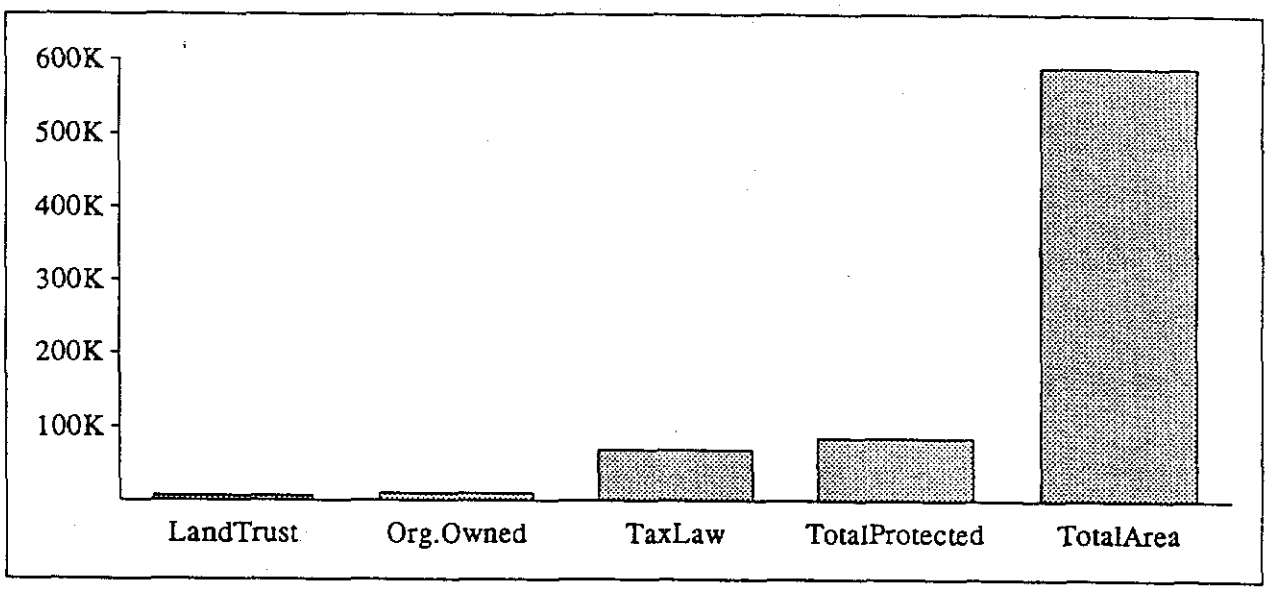
As testament to its recreational appeal, Penobscot Bay offers a slate of open space. Table 3 details conservation land held through land trusts and conservation organizations, as well as land held under preferential tax treatment.

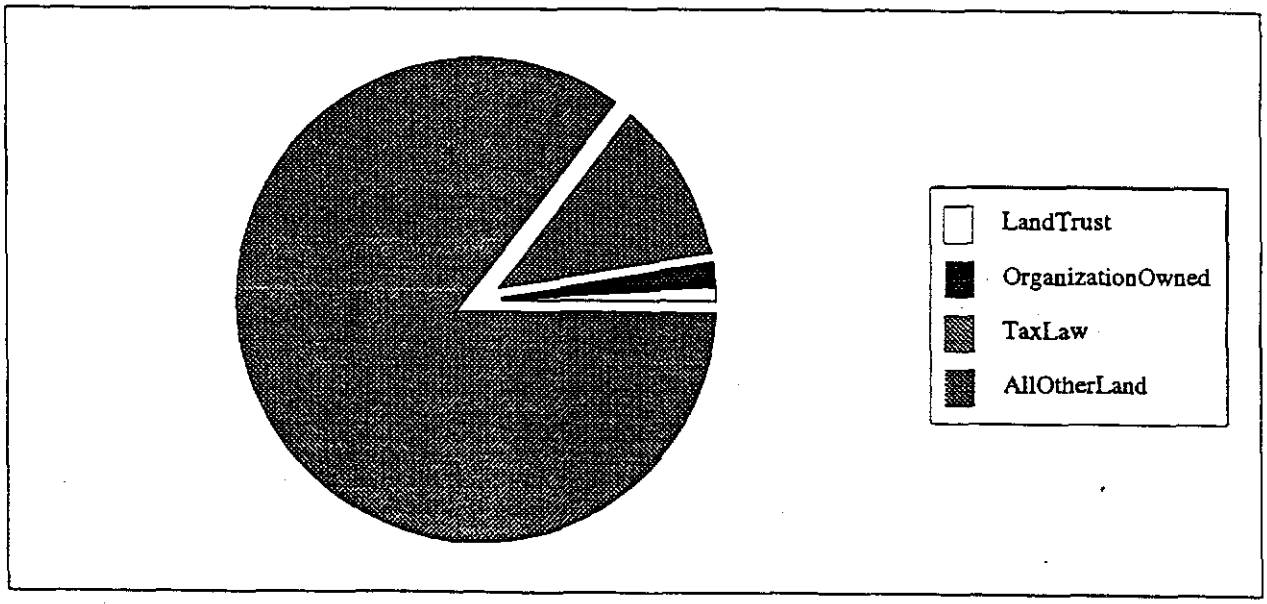
Table 3.
Total conservation acreages in Penobscot Bay region

Protected by	Total Acres
Land Trust	6,168.04
Conservation Organization Owned	9,943.02
Preferential Tax Treatment	68,451.00
Total Acres Protected	84,562.06
Total Acres in Area	588,928.00
% Protected/Total	14.36%

Figure 3 details the amount of land under each treatment. Appendix A details dedicated open space owned by the State of Maine, land trusts and the Federal Government. The listing also includes conservation easements for scenic or recreational purposes. Appendix B details the amount of land or conservation easements held by land trusts in the region.

Figure 3.


600K
500K
400K
300K
200K
100K
LandTrust
Org.Owned
TaxLaw
TotalProtected
TotalArea


LandTrust
OrganizationOwned
TaxLaw
AllOtherLand

Penobscot Bay has five State Parks: Camden Hills State Park in Camden, Moose Point State park in Searsport, Holbrook Island Sanctuary in Brooksville, Fort Knox State Park in Prospect and Fort Point State Park in Stockton Springs. Isle Au Haut, part of Acadia National Park is also found in Penobscot Bay.

The Maine Island Trail Association offers 15 islands within Penobscot Bay for camping and day use. Most of these islands are state-owned islands and members are encouraged to use the islands in ways that will have little or no impact.

B. Recreational Boating

Recreational boating is significant within the Penobscot Bay region. Table 4 shows the number of registered recreational boats in each of the four counties that rim the Bay. The column marked questionnaire responses documents the number of coastal boats identified in a USACE survey of coastal marinas and boat yards. The number in parentheses behind the county name corresponds to the survey return rate within the county. These numbers are considered conservative because of the incomplete return rate.

Table 4.
Coastal recreational boating indicators by county (1992)
(Questionnaire Responses)

County	Registered Vessels	Vessels	Marinas/ Yacht Clubs
Hancock* (76%)	4,939	2,204	22
Knox (71%)	3,423	1,756	15
Penobscot (100%)	2,837	223	0
Waldo (50%)	1,931	532	3
Total	13,130	4,715	40

* Penobscot Bay includes about half of Hancock County, so these numbers are probably lower.
Source: USACE, 1994

Other sea-based leisure activities in Penobscot Bay for which there is data include sport-fishing, whale-watching, windjammer and charter sails, and harbor and day cruises. Table 5 presents data on the number of vessels offering these activities in each of the four counties on the Bay.

Table 5. Commercial vessels engaged in sea-based leisure activities				
County	Sport-fishing	Whale Watching	Windjammers/ Charter Sails	Harbor/ Day Cruises
Hancock* (76%)	14	7	17	22
Knox (71%)	5	1	26	9
Penobscot (100%)	0	0	0	0
Waldo (50%)	0	0	1	2
Total	19	8	44	33

* Penobscot Bay includes about half of Hancock County, so these numbers are probably lower.
Source: USACE, 1994

2. Commercial Uses of Penobscot Bay Including Tourism

A. Fisheries

Maine's commercial fishing industry plays an important role in the overall fish catch of the U.S. Nationwide, Maine's catch ranked eighth in tonnage landed and sixth in value in 1992. The USACE estimates that in 1992, the overall economic impact of Maine's commercial fishing industry was $1.1 billion.

Penobscot Bay provides important commercial fish species that in turn provide income for a sizeable population. Knox and Hancock counties contributed 19% and 15% respectively of the value generated by Maine's fisheries. Through an extensive survey, the USACE found that at least 708 commercial fishing vessels operate out of Hancock County and 328 operate out of Knox County (USACE, 1994). The actual numbers may be higher for the Northeast Fisheries Management Council (1993) documented that in 1991, 150 to 200 inshore lobster boats, employing 200 to 400 fishermen seasonally; 10 to 15 gillnetting vessels, employing 33 to 60 people; and one dragger operated just out of the port of Stonington.

Table 6 shows 1992 total finfish and shellfish catch by county in Penobscot Bay. This data is aggregated on a countywide basis so that Hancock County data tends to overestimate Penobscot Bay's contribution.

Table 6. Commercial fishing catch for 1992 (in millions)						
	Finfish*		Shellfish		Total	
County	Catch (lbs)	Value ($)	Catch (lbs)	Value ($)	Catch (lbs)	Value ($)
Knox	49.7	$5.2	13.6	$25.2	63.3	$30.4
Hancock**	10.4	3.7	11.8	20.4	22.2	24.1
Waldo	n/a	n/a	.02	.1	.02	.1
Total	60.1	$ 8.9	25.42	$45.7	85.52	$54.5

* Finfish includes groundfish which are caught within the larger Gulf of Maine
** Hancock County extends beyond Penobscot Bay, so these figures overestimate the value.
Source: USACE, 1994

Table 7 shows the value of landings in both Knox and Hancock Counties of shellfish species that come from Penobscot Bay. This breaks down the shellfish category in Table 6 above. While this is the most detailed information possible, the landings from Hancock County reflect landings from throughout the county, including areas outside of Penobscot Bay. Lobster is the predominant species landed in the region. In addition, 110,000 lbs. of soft-shell clam meats were landed in Knox County in 1993, and 75,000 lbs. from Hancock County.

Table 7. Penobscot Bay fisheries landings values ($millions)		
	1993	1993
Species	Hancock	Knox
Lobster	12.8	23.6
Mussel	1.2	.11
Scallop	6.1	.73
Shrimp	.03	.03
Total	20.13	24.47

Source: NMFS landings data.

A proportionately low percentage of clam habitat in Penobscot Bay is currently open for harvest. Most of it is closed due to sewage pollution (see Figure 4). Some clean-up has taken place over the past decade and with further mitigation initiatives and water quality surveillance, more flats may become available (P. Anderson, DMR, pers. comm. 2/95).

Swan's Island hosts a fledgling aquaculture project called the Island Aquaculture Company (IAC). The farm raises salmon and trout in 10 cages holding 100,000 fish. IAC has been working to establish a marine hatchery at Swan's Island.

Regulations proposed by the New England Fisheries Management Council will significantly affect the contribution of offshore fisheries landings value in the region in the next five years. This is expected to increase the fishing pressure on near-shore fisheries resources in the area as harvesters look to new sources of fish and seafood.

B. Coastal Industries

Coastal industries contribute substantially to the economies of the Penobscot Bay region through value-added industries, such as seafood processing, or support industries, such as boat-building and repair. Table 8 represents a portion of figures developed by the USACE (1994) as part of a cost/benefit analysis for coastal dredging. The information is broken down by SIC code and shows the relative output of Maine coastal industries in the region based on AIMS multiplier analysis. The first column portrays the direct, indirect and induced economic activity produced by various coastal industries for the four counties that rim Penobscot Bay. The second column estimates the number of jobs provided by various coastal industries within the four counties abutting Penobscot Bay.

C. Tourism

Penobscot Bay offers a myriad of activities to charm and entertain the visitor: day sails, schooner rides, hiking, seafood restaurants, museums and more. Recent studies by the Maine Office of Tourism found that people perceive Maine as a scenic and natural destination. In a focused advertising campaign in the mid-Atlantic in 1994, they found that while visiting Maine people sightsee (91%), shop (87%), visit small towns and quaint attractions (76%), tour historic sites (53%), and enjoy fishing, boating and water activities (46%) (MOT, 1994). Because of its rural character and strong fishing tradition, Penobscot Bay is rich in these opportunities.

In the Penobscot Bay region, the State Planning Office estimates that tourists spent over $210 million in 1990, a 220% increase since 1982. Tourism has grown faster than the overall economy in the region as total taxable retail store sales have increased only 98% in the region during this same period.

Figure 4.

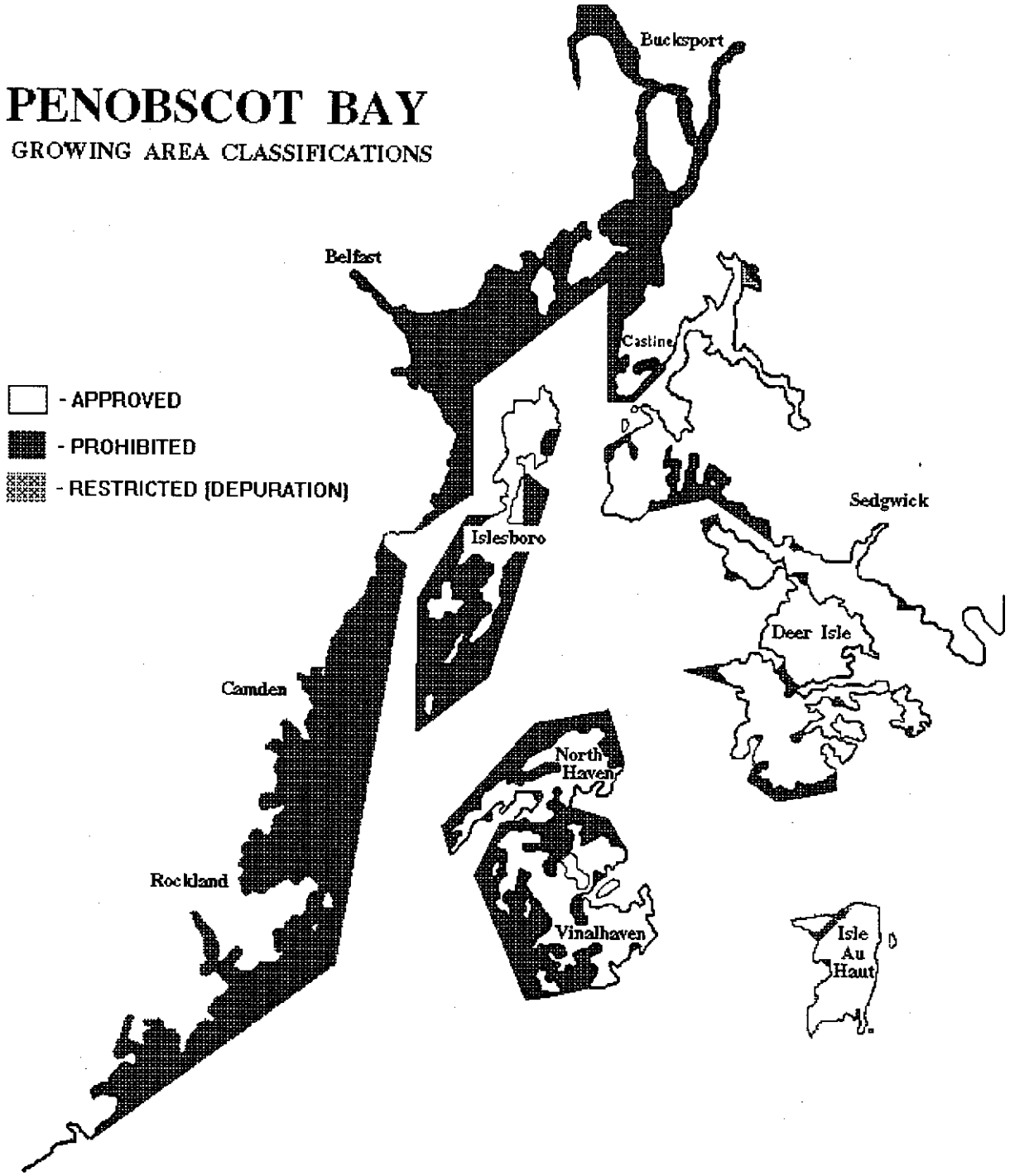

PENOBSCOT BAY
GROWING AREA CLASSIFICATIONS
- APPROVED
- PROHIBITED
- RESTRICTED (DEPURATION)
Bucksport
Belfast
Castine
Sedgwick
Islesboro
Deer Isle
Camden
North Haven
Rockland
Vinalhaven
Isle Au Haut

Table 8.
Estimated total economic activity and employment generated by Maine coastal activities in Penobscot Bay, 1992

Industry	SIC	Economic activity[1] ($MM)	Total Employment (# jobs)
Fishing, hunting, trapping	900	$ 93.4	40
Canned and cured fish and seafood	2091	70.9	40.00
Fresh or frozen prepared fish	2092	123.1	958
Ship building and repair	3731	5.6	229
Boat-building and repair	3732	38.7	1015
Water transport of passengers	4480	11.5	N/A
Deep sea transportation (excl. ferries)	4481	N/A	20
Ferries	4482	N/A	13
Water transport (nec)	4489	N/A	41
Marine cargo handling and misc.	4491 4499	2.3	27
Towing and tugboat services	4492	1.5	21
Marinas	4493	13.2	178
Fish and Seafood (wholesale trade)	5146	131.7	571
Boat dealers	5550	23.9	115
TOTALS		515.80	3,188.00

Source: Adapted from USACE, 1994

[1] Direct, indirect, and induced economic activity

D. Marine Shipping and Cargo Operations

Searsport and Bucksport/Bangor on the Penobscot River represent two sizeable cargo handling areas within Penobscot Bay. The products handled fall into two categories: petroleum products and dry and bulk cargo. The amount of cargo handled at each of the ports is shown in Table 9.

Table 9.
Cargo tonnage handled in Penobscot Bay for 1992

Town	Dry and Bulk Cargo	Petroleum Products	Total
Bangor/Bucksport	N/A	1,410,080	1,410,080
Searsport	390,705	1,125,592	1,516,297

Source: USACE, 1994.

E. Recreational Boating

Recreational boating along Maine's coast directly accounts for $84 million in economic activity; taking into account indirect and induced effects, it generates $158 million (USACE, 1994). Using data generated by the USACE, a little more than 25% of recreational boats registered along the coast are within the Penobscot Bay proposal area. This translates into about $21 million in direct economic activity and about $40 million in indirect and induced effects. The USACE suggests that their figures underestimate the economic effects of recreational boating in the region.

3. Demonstrates the Value of the Estuary's Living Resources

See discussion under section 5.

4. How Changes Would Affect the Local or Regional Economy

Recreation, tourism, and other sea-based leisure activities in Maine depend on an underlying scenic beauty, relatively pristine environment, and a diversity and wealth of wildlife. The Maine Office of Tourism found that people perceive Maine as a scenic and natural destination and come to Maine for those qualities (MOT, 1994). Penobscot Bay is rich in these characteristics, and a major sector in the local economy is dependent on this appeal.

As documented above, the natural resources and scenic beauty of Penobscot Bay figure predominantly in the economies of the region. Fisheries and its support-services rely on a clean and viable environment. Tourism, especially in Maine, is based on the perception of the state as

pristine, natural and attractive. Deterioration of the estuary would have a significant effect on both of these sectors.

The Penobscot Bay region is more reliant on tourism than it has been in the past. It has experienced a shift away from manufacturing jobs to jobs within service industries. Twenty six percent of the labor force was employed in the service industry in 1990, while in the 1970s, services employed only 18% of the population. A decline in manufacturing jobs mirrors this increase (Benson, 1993).

Attracting new businesses also depends on a clean environment. The Eastern Maine Development Corporation found that "the great physical beauty and attractions of the Penobscot Bay region undoubtedly play a major role in encouraging the location of businesses and retirees into the area." They also found that the principal advantages of locating a business in Knox County region were quality of life and a high quality natural environment (EMDC, 1994).

This proposal hopes to build on the appeal of Penobscot Bay by addressing major environmental problems and building on and preserving the strengths that already exist in the region.

5. Penobscot Estuary's Living Resources

A. Wildlife

A 1987 study of Penobscot Bay's wildlife and habitat identified 46 wildlife concentration areas of state or national significance. These areas support 40% of the average annual population of coastal wildlife (all species) in Penobscot Bay. Special wildlife features identified included ten active eagle nests, five great blue heron colonies, 123 colonial nesting seabird islands, and 71 shorebird feeding and roosting areas.

Maine has the only nesting population of bald eagles in New England. In 1986, 85 pairs of eagles were found nesting in Maine and produced 75 young. Penobscot Bay has 10 active and 4 historic bald eagle nesting territories. Reproductive rates in Maine remain 10 -30% lower than healthy populations elsewhere in the U.S. However, because of the increased survival of young eagles, due in part to a winter feeding program, the population is still increasing.

The osprey population in Maine is recovering from a dramatic decline. Like bald eagles, ospreys are extremely sensitive to environmental contaminants. However, because of their greater reproductive rates and higher tolerance of human activity, the osprey population has increased dramatically during the last decade.

Twenty species of colonial-nesting seabirds breed in Maine. Many of these birds are at the northern or southern limit of their range, and for several (common eider, black guillemot, Atlantic puffin, razorbill auk, great cormorant, Leach's storm petrel), Maine is the only one of the contiguous 48 states with breeding populations. Penobscot Bay supports more than 26,000 pairs of

nesting marine birds on 123 islands and ledges. Populations of colonial nesting seabirds throughout Maine were decimated by the late 1800's from overharvesting for meat, eggs, and feathers. Protective legislation, passed in 1918, and the coincident collapse of island-based economies has allowed a certain degree of recovery for these birds.

Maine has the only nesting population of great blue herons in New England. In 1983, 7 of the state's 20 island colonies, supporting 200 nesting pairs, were located in Penobscot Bay. In 1986, the nesting population had dropped to 131 pairs in 5 colonies.

Shorebirds are a closely related group of species represented in Maine by the sandpipers, plovers, turnstones, curlews, dowitchers, and phalaropes. Six species, including the endangered piping plover, breed along the coast, and one species, the purple sandpiper, is a winter resident. Although many are in Maine only briefly during their migration, the 25 species of shorebirds require special management consideration because large numbers of these birds depend on coastal habitats in Maine for feeding and resting during their long migration from their Arctic breeding grounds to their South American wintering areas. During their stay in Maine, most shorebirds feed intensively on intertidal invertebrates and nearly double their weight in fat reserves. The coastal habitats these birds use are critical to the continued success of their annual migrations.

Maine is the only state of the 48 contiguous states supporting a breeding population of the common eider. Penobscot Bay supports an estimated 8,805 pairs on 89 islands, representing 40% of the State's breeding population.

Maine has the largest population of harbor seals of any Atlantic state, and supports the only significant breeding population in the eastern United States. Gray seals, much larger than harbor seals, are uncommon but regular visitors to the Maine coast; they do not breed in Maine. Maine's population of harbor seals more than doubled between 1973 and 1986 to an estimated 13,000 plus animals. Seventeen hundred pups were born in 1986 of which approximately 25% were born on traditionally-used islands and ledges in Penobscot Bay. Estimates of the gray seal population are not reliable.

The Minke whale, humpback whale, right whale, finback whale, pilot whale, whitesided dolphin and harbor porpoise have been observed in the vicinity of Penobscot Bay. Of these species only the harbor porpoise, whitesided dolphin and Minke whale are known to enter Penobscot Bay. Siting data suggest that the largest concentrations of cetaceans are present in Penobscot Bay from May through October. The animals appear to move north and east during the summer months, and return south in the fall. For harbor porpoises the pattern may be related to food availability, changes in water temperature, and predator avoidance. Porpoises winter offshore on Georges Bank where temperatures are warm and food is plentiful. As temperatures rise, fish move northward into other areas of the Gulf of Maine, followed by the porpoises. During the summer months large sharks move into the area of Georges Bank; the appearance of these sharks tends to disperse the porpoise populations into other regions of the Gulf of Maine. A harbor porpoise study was conducted along the coast of Maine in the summer of 1982; the survey concentrated on open coastal areas in the Gulf of Maine, but included a random sampling of both lower and upper

Penobscot Bay. Most of the Penobscot Bay sightings were in the lower bay, including some mother and calf pairs. Harbor porpoises are most prevalent in Penobscot Bay from July into the fall. This presence is probably related to herring migrations into the Bay (USDOT/FHA & MDOT, 1987).

Leatherback turtles, listed as endangered by the State of Maine, have been sighted at Winter Harbor near Haddock Island. Most sea turtle sitings in the Gulf of Maine occur from May to October as water temperature apparently influences their distribution and seasonal occurrence (USDOT/FHA & MDOT, 1987).

B. Anadromous fish

Historical records indicate that the Penobscot River was richly endowed with abundant anadromous (sea-run) fish runs which include Atlantic salmon, American shad, alewife, blue-back herring, striped bass, sturgeon, and rainbow smelt. American shad runs were reported inland as far as Millinocket on the Penobscot's West Branch and extended up the East Branch for a distance of about 170 miles above tidewater. Historical references place the size of this run at 2,000,000 adult fish, second only in Maine to that of the Kennebec River. Alewife runs extended up the Penobscot River to the same limits as occupied by American shad. The historical alewife run is estimated to have exceeded 25,000,000 adult fish. Atlantic salmon historically utilized almost all the Penobscot River clear to its headwaters and estimated annual runs were in excess of 75,000 fish, the largest run in Maine. Rainbow smelt, one of the most valuable species, occupied all tributaries and main stem habitat of the Penobscot River up to and immediately above head-of-tide at Veazie. Historical smelt runs are estimated to have exceeded 5,000,000 adult fish (Penobscot Bay Conference Proceedings, 1993).

Atlantic salmon returns to the Penobscot River in 1993 totaled 1,769 fish, down 26% from 1992. The angling catch on the Penobscot River in 1993 was 124 harvested and an estimated 450 released. Four hundred and eighty six fish were collected for broodstock. A record 1.3 million fry were stocked in the Penobscot River drainage in 1993 (Annual Report of the US Atlantic Salmon Assessment Committee, 1994). The Atlantic salmon has been nominated as a federally endangered species; with specific reference to Penobscot Bay, it has been proposed that the species be listed as endangered in the Penobscot River and threatened in the Duck Trap River.

Several small rivers flowing into Penobscot Bay (listed in Table 10) support or have supported the commercial harvesting of eels (Maine DMR and DEP, 1984).

Table 10.
Small rivers now or at one time supporting recreational fisheries for smelt, alewives, brook trout, Atlantic salmon, striped bass, and shad and commercial harvesting of eels

Goose River, Rockport	Morrow Brook, Searsport
Lilly Pond Brook, Camden	Mill Brook/Searsport Stream, Searsport
Megunticook River, Camden	Bagaduce River, Castine/Brooksville
Camden Harbor Brook, Camden	Smelt Brook, Penobscot
Great Brook, Lincolnville	Orland River, Orland
Frohock Brook, Lincolnville	South Branch Marsh River/ Colson Stream,
Duck Trap River, Lincolnville	Prospect
Wescot Stream, Belfast	North Branch Marsh River, Frankfort
Little River, Belfast/Northport	Bald Hill Cove Brook, Winterport
Passagassawakeag River, Belfast	Souadabscook Stream, Hampden
Seal Cove Brook, Vinalhaven	Burntland Pond Brook, Stonington
Perry Creek Brook, Vinalhaven	Walker Pond Stream, Brooksville
Smith Cove Brook, Vinalhaven	Black Pond Stream, Brooksville
Fresh Pond Brook, North Haven	Frost Pond Stream, Sedgwick
Crockett Brook, Northport	Camp Stream, Penobscot
Shaw Brook/Saturday Cove Brook, Northport	Meadow Brook, Brooksville
Goose River, Belfast	Winslow Stream, Penobscot

C. Commercial species

Penobscot Bay is a nursery for many species of fish and shellfish, many of commercial or recreational importance. A 1983 study identified 37 species of fish; most of the fish caught were juveniles 1"-6" in length (National Fisherman, 1983).

Spawning populations of scallops, red hake and Atlantic mackerel occur at the mouth of Belfast Bay. Their occurrence has caused concern over a proposal to dispose of dredge spoils in the area. It is estimated that dredging in the Penobscot River will be generate 150,000 cubic yards of dredge spoils in the next ten to fifty years (USACE, 1994).

Penobscot Bay provides excellent nursery grounds for juvenile lobsters and rising water temperatures over the last decade may be providing thermal thresholds which are conducive to larval survival and improved seeding of the nursery grounds. Furthermore, lobster survival is enhanced in Penobscot Bay due to the removal of many of the traditional predators, such as cod

and wolffish which have been fished out of the bay (Status and Future of Commercial Fisheries in Penobscot Bay, 1994).

There are approximately 3,000 acres of productive shellfish habitat in Penobscot Bay (Maine DMR and DEP, 1984).

6. Penobscot Bay's Biogeographic Region Differs from Other NEPs

The flora and fauna of Penobscot Bay are affected by the Gulf of Maine ecosystem. The eastern end of the Gulf is affected by the giant tides of the Bay of Fundy; as a result, it is much cooler than the western end of the Gulf and supports a cold-tolerant community of plants and animals. The "break" between the two zones occurs at Penobscot Bay. The Bay, therefore, supports a transitional community with organisms from each biogeographic zone. Penobscot Bay offers the National Estuary Program a unique opportunity due to the species diversity supported by its unusual biogeographic setting. A tremendous range of fish, birds, invertebrates and mammals inhabit Penobscot Bay during all or part of the year or during all or part of their life cycle; many of these depend upon the Bay for their continued survival. The Bay's unique biogeographic setting and relatively undisturbed state present a rare opportunity to protect an important component of the biodiversity of the region and of the nation.

7. Effects of Changes in Estuarine Quality and Any Trends

The principal factor in exterminating shad and alewife runs and greatly depleting Atlantic salmon runs above Bangor was the construction of dams. A dam built in 1830 in Old Town was low enough to allow passage of fish. The Veazie Dam, built at head-of-tide in 1835, caused total destruction of shad and alewife fisheries and greatly diminished the Atlantic salmon run. With the advent of industrial pollution, principally from pulp and paper mills, Atlantic salmon were eliminated and rainbow smelt, along with remnant populations of shad and alewives, were further diminished in the river below Bangor.

With the commencement of pollution abatement in the mid-1960's and concurrent construction of fish passages in the main stem and tributary dams of the Penobscot watershed, the prospects for restoration of salmon, shad, alewives, and rainbow smelt is improving. Based on the availability of habitat and the ability of various fish species to pass through fishways, the Penobscot River could presently produce runs of up to 8,000 salmon; 500,00 American shad; 12,000,000 alewives; and 5,000,000 rainbow smelt. These runs would support significant commercial and recreational fisheries in the estuary, provide a valuable food source to ospreys, eagles, and herons, and also provide a forage base for freshwater, estuarine, and marine species of the Penobscot Bay area (Penobscot Bay Conference Proceedings, 1993).

In 1976, there was a very large scallop set in the Bay; these scallops provided a bumper crop for fishermen in 1980. One million pounds of scallop meats were taken from the upper Bay in a month period. The scallop stock has never recovered; there hasn't been a significant scallop set west of Cape Rosier in 20 years. This may be due, in part, to the fact that the size of the harvest

attracted boats with otter trawls which cause more damage to the bottom than traditional scalloping gear (J. Quintrell, per. comm., 3/95). Scallop sets may also have been hampered by toxic contamination (Status and Future of Commercial Fisheries in Penobscot Bay, 1994).

Bald eagle numbers in Maine began a slow but steady decline in colonial times, primarily as the result of habitat loss and human persecution. This decline was greatly accelerated in Maine after 1945, when DDT and other organochlorine pesticides were used extensively for spruce budworm and agricultural pest control. DDT was banned in 1972; however, due to its slow decomposition rates in Maine's forest soils, it still adversely influences the production of some pairs. The increase in land development and recreation occurring in the Penobscot Bay threatens the recovery of bald eagles in Maine.

Survival of the osprey depends increasingly on the species' ability to associate with humans. Suitable nesting habitat adjacent to foraging areas continues to be lost, and many birds are forced to adapt to man-altered habitats

The explosion of development along the coast that began in the 1980's is threatening to reverse the recovery trend of colonial nesting seabird through the escalating demands on islands for recreation and homesites. To maintain Penobscot Bay's populations of colonial nesting seabirds, these nesting islands must be made available in an undeveloped and undisturbed state.

The two most important factors governing the continued presence of both inland and coastal nesting great blue herons in Maine are the availability and abundance of undisturbed nesting habitat and undisturbed and uncontaminated feeding areas. Human disturbance of a nesting colony can cause: 1) abandonment of the entire colony; 2) mortality of eggs and young on the nest from predation (gulls, ravens, eagles) and exposure; and 3) starvation and predation of young that leave the nest before they are able to fly (adults will not feed young on the ground).

III. Transferability

1. Penobscot Bay Estuary Will Add Significant Information to the NEP

Penobscot Bay offers a unique situation for the NEP Program in that the bay is relatively pristine with problems that are fairly distinct in nature. The Bay offers an opportunity to assess issues in an environment that is not dominated by industry but instead hosts natural resource-based ventures. Focusing attention on and addressing the individual problems confronting Penobscot Bay allows EPA, Maine and other NEPs to assess the effectiveness of the range of techniques used without masking from other major environmental problems that contribute to overall problems within the bay. The effects of many actions or programs should be measurable and quantifiable.

The wealth of islands in the Bay offer special opportunities to examine issues and solutions because of their physical isolation and extreme dependence on natural resources for economic survival. Many of the islands have year-round communities that offer a variety of cultures and settings in which to develop solutions.

2. Readily Transferable Innovative Management Techniques or Approaches

The goals of sustainable economic development are readily transferable to many estuaries within the nation, particularly those that will likely never become part of the National Estuary Program. These issues are particularly important for rural areas with little organized support and infrastructure to address sustainable development issues.

This project also supports innovative management efforts. It will build on preliminary efforts by the Maine Department of Marine Resources (DMR) and UM Cooperative Extension to address and remediate pollutant sources responsible for closing shellfish beds. Traditionally, after careful monitoring the DMR closes clam flats, identifies the contributing problems, and transfers the project to the Department of Environmental Protection (DEP) to remediate the problem. DEP has several grants programs to help communities and individuals address these problems. However, many of the rural towns within Maine do not have the expertise or personnel to process grants and at times do not see the linkages between these problems. The DMR, with help from the UM Cooperative Extension, has a pilot project in Beals and Jonesport that uses AMERICORPS staff people to process grants and begin working with communities in a collaborative process to address and remediate the causes of these closures. The towns seem to appreciate the effort and the project has been successful. Funding of this grant request would allow this approach to be introduced into Penobscot Bay and further refined for application in other estuaries.

Finally, the core group that has developed this proposal (the Penobscot Bay Network) consists of a collaboration of state, local, non-profit and business organizations that have identified the need for a focus on Penobscot Bay, without funding or direction from outside. This nucleus of

organizations offers an example of a framework to gather support for a project that can be transferred to groups in other areas that would benefit from developing a focus for their concerns.

3. Results can be Expected in a Short Time Frame and are Readily Transferable

The basic framework for regulating and addressing many of the problems identified in this proposal exists, however, the geographic focus, outreach, consensus-building and networks needed to effectuate change are what is lacking.

The draft conference agreement and goals section of this proposal outline specific actions that can quickly and readily make a difference in overall management of Penobscot Bay. Actions to be taken in the first year include the basic survey work to identify problems and characterize additional work to focus efforts within Penobscot Bay.

Specific examples from the draft conference agreement and work plan include:

* Inventory sources of non-point pollution to identify those made up of potentially controllable point sources.

* Provide training for communities to establish local shellfish management plans and committees.

* Evaluate role of recreational uses of estuary and establish appropriate networks for encouraging low-impact uses.

* Convene working group to determine priority species in Penobscot Bay in need of habitat protection.

4. Identifies Process for Sharing Information with other Estuary Managers, Including a Peer Review, Reporting and Distribution Plan for Environmental Management and Other Significant Findings

The process for sharing information from the Penobscot Bay Estuary Project will include:

* An annual conference on the state of Penobscot Bay to document and discuss issues, monitoring, and changes in the Bay over the past year. Building off the conferences held by the Penobscot Bay Network in 1993, and 1994, these conferences would reach a wide variety of stakeholders in Penobscot Bay as well as people working within other estuaries. Between 100 and 200 people have attended the previous conferences to focus attention on the region and document trends (see Appendix C for attached conference proceedings, Appendix D for agendas, and Appendix E for newspaper articles).

* Coordination, communication, and when possible attendance at meetings of the Gulf of Maine Council on the Environment to disseminate data and findings to other estuaries within the Gulf of Maine.

* The development of a data management plan to communicate data and information with other estuary managers. This will include active participation in EPA's technology transfer conferences to share project findings and dissemination of reports and information to other Estuary Projects after consultation with EPA.

* Publication and dissemination of information through existing channels. The *Inter-Island News* and *Working Waterfront* published by the Island Institute, circulate to 5000 island residents, businesses, conservationists, state agencies and marine-based communities.

* A peer review of each project funded by the Penobscot Bay Estuary Project prior to its release.

* Association with other Estuary Projects at the national level to glean and share project learnings not only on the data and information, but on process issues as well. Maine is fortunate to have another Estuary Project within driving distance. Staff from the Penobscot Bay Estuary Project will meet with staff from the Casco Bay Project regularly to learn from their experience and share information from the Penobscot Bay Region.

* The State of Maine has a Geographic Information System. The Penobscot Bay Estuary Project will work with the Office of GIS to become a repository of the data generated by the Penobscot Bay Estuary Project.

* Significant outreach to towns will be done with the benefit of the GIS maps developed through the project. Visual information is expensive and difficult to obtain within the state. The Casco Bay Estuary Project has found this to be an extremely effective tool to focus attention on and portray the linkages between environmental issues.

* Within Maine, there is a paucity of well-organized data on natural resources. Outreach to the scientific and governmental community will ensure that once developed, the information will become widely used and received.

* Assistance in sponsoring publications and conferences that address issues vital to the Bay.

IV. Major Environmental Problems

1. Identifies Priority Problems and How They Were Identified

The Penobscot Bay Network proposes to focus on three priority problems within the scope of the Penobscot Bay Estuary Project. These three problems are:

A. Poor water quality in the Bay that affects the availability of shellfish, the contamination of fisheries resources, and the overall viability and health of the estuary. The source of this poor water quality is point source discharges within the watershed, non-point sources, poor sewage treatment practices, and the lack of best management practice use within agricultural areas of the watershed.

The Executive Summary of Maine's 1994 Water Quality Assessment (DEP, 1994) states that "the control of nonpoint source pollution is crucial to protecting Maine lakes, ground water, wetlands, coastal bays and restricted estuaries, smaller riverine waterbodies and selected larger rivers." That assessment document addresses four categories of water resources and discusses the significant causes and sources affecting water use.

Rivers and streams are affected by dioxin from Kraft pulp and paper mills; by organic enrichment and nutrients from a wide variety of nonpoint sources; and by bacteria from municipal point sources, inadequate on-site wastewater treatment systems, and untreated discharges. The first-flush from urban stormwater runoff is especially rich in contaminants. Sixty-nine miles of rivers or streams -- including Burnham Brook, Kenduskeag Stream, and most of the main stem of the Penobscot River -- are classified as "water-quality limited," meaning that they presently are not expected to meet their classification standards.

Lakes and ponds are affected by nonpoint source organic enrichment and nutrients from urban runoff, shoreline development (camp roads and individual disposal systems), agriculture, and silviculture. Forty-three lakes and ponds are not expected to attain their water quality standards. They range in size from 10 acres to 10 square miles in size and are found in urban, rural, and remote areas. Examples include Seboomook Lake, Mattawamkeag Lake, Lake Onawa, Swan Lake, Cold Stream Pond, and Hermon Pond. Nearly 80 other lakes and ponds are listed as "threatened", including Pushaw Lake, Brewer Lake, Chickawaukie Lake, and Lower Patten Pond.

Marine and estuarine waters are closed to the harvesting of shellfish when there is evidence of actual or potential sewage pollution. Water quality monitoring utilizes the fecal coliform indicator to identify areas which are polluted by sewage. Potential sources of pollution are also identified through intensive shoreline surveys and other field observations. There are at least 6 municipal waste water treatment plants in the coastal areas of the estuary causing direct impacts on the water quality of Penobscot Bay and another 8 plants up the Penobscot River causing indirect impacts on the Bay's water quality. Additional sewage pollution problems come from

marinas and other areas where boats are moored. Many of these areas are in harbors already impacted by sewage pollution, but there are some small harbors which must be closed, at least seasonally, to shellfishing.

Sewage pollution from individual septic problems and licensed overboard discharges are also a big problem in the estuary. However, abatement mechanisms are available and through coordination of these efforts it will be possible to better characterize the magnitude of the impact and work towards clean-up with the ultimate goal of re-opening shellfish beds. By eliminating individual septic system problems, and evaluating potential impacts from other point and non-point sources through monitoring and surveys, it is possible for a significant number of shellfish beds to reopen to some shellfish harvesting.

The long term project goal is to have as many waterbodies meet their classification standards as is practicable.

B. Significant wildlife and marine resources habitat has been lost in the past. This habitat needs to be protected and restored where possible.

The Penobscot Bay region hosts an abundance of habitats that are essential to a wide variety of wildlife and marine species throughout their life-cycles. Be it the myriad sea-bird nesting islands, overwintering areas, migratory resting points or important spawning and nursery areas, the region plays a vital role in sustaining the populations of many important species. Ensuring the continuation of these important habitats is key for protecting and restoring species populations.

The Penobscot Bay conferences identified the concern for the protection and restoration of the region's abundant wildlife and marine resources habitat. Initial identification of this concern came from the Maine Department of Inland Fisheries and Wildlife's Penobscot Bay Plan which outlined the development pressure in the Bay in the late 1980s.

C. The need to foster sustainable natural resource-based industries that depend on a clean, viable ecosystem.

The Penobscot Bay Conferences began a discussion of how traditional industries and emerging economic interests can utilize natural resources of the region in an environmentally responsible manner. In Penobscot Bay, there is a need to focus on the linkages between a viable, well-functioning environment and economic development. Specifically, this involves understanding and promoting sustainable economic opportunities in the region, minimizing conflict over resource use and development, educating decision-makers about the economic value of good stewardship of our resources, and consensus-building for the overall goals articulated by the National Estuary Program.

2. Process for Selecting Priority Problems and Involvement

The three problems highlighted in this proposal have been identified through consensus and public input by the Penobscot Bay Network as the primary issues facing the Bay. These issues have emerged through the Network's extensive work and contacts within the region. The Penobscot Bay Network is a collaboration of organizations interesting in promoting the health of the Penobscot Bay region. Membership represents research capabilities, regulatory duties, education and outreach activities, economic development, planning functions and advocacy.

The Penobscot Bay Network's two annual Penobscot Bay Conferences provided the initial focus for gathering information on issues affecting the Bay and discussed the causes and implications of each (see Appendix C). These three specific problems were identified and articulated at a meeting held in mid-February 1995, attended by nineteen members of the Network. A subcommittee refined these issues and developed a list of objectives and tasks for approval by the larger group.

3. All Major Problems are Sufficiently Addressed and Documented in Monitoring Data and Studies

Efforts to characterize environmental problems in the Penobscot Estuary began in the 1970s, when clean up of the Penobscot River and the State's other grossly polluted rivers was initiated. The focus began to shift to the estuary, including the Bay, in the 1980s. In 1982, NOAA commissioned a study of toxic contaminants in the sediments of Penobscot Bay. The study found that with the exception of cadmium, trace metal concentrations were elevated well above presumed pre-industrial levels. Mean values of chromium, copper and lead were comparable to levels from other industrialized New England areas, while nickel and zinc levels were the highest yet reported (Larsen, et al., 1983). The study also found that levels of polycyclic aromatic hydrocarbon (PAH) concentrations fell within the range found in industrialized regions throughout the world and were significantly higher than would be expected for an area previously considered to be uncontaminated. Atmospherically transported particulate combustion products were hypothesized as a major source of PAH contamination (Johnson and Larsen, 1985). The study noted a distinct gradient in contaminant concentrations decreasing from the head of the Bay oceanward as well as similar gradients in each of the harbors of the Bay. Other studies indicate that heavy metal levels in blue mussel tissues from Penobscot Bay are among the highest in the State (Doggett and Sowles, 1989).

Maine's Dioxin Monitoring Program was established in 1988 by the Maine Legislature "to determine the nature of dioxin contamination in the waters and fisheries of the State". Concentrations of dioxin and furan toxic equivalents in fish taken from the Penobscot River in 1993 were significant, meaning that they exceeded the Department of Human Services' Bureau of Health's recommended maximum concentrations for the protection of consumers from an increased cancer risk of one in one million (10^{-6}) (0.15 ppt) and for protection of consumers from adverse reproductive effects (0.37 ppt). TCDD concentrations in the meat of lobsters from the Penobscot

Estuary were not significant but toxic equivalents were marginally so. Concentrations of both TCDD and toxic equivalents in tomalley (hepatopancreas) were highly significant, about 15-40 fold higher than in the meat. Consequently, on February 4, 1994 the Maine Bureau of Health, in consultation with the Departments of Environmental Health and Marine Resources, issued a consumption advisory (Mower, 1993).

There are several initiatives to document the status of resources in Penobscot Bay. The Penobscot Bay Conferences concluded that an overall assessment of the Bay's resources was needed. The Island Institute has taken the lead in the funding and compiling a State of the Bay report (see outline in Appendix F). This document will identify gaps in knowledge and highlight trends that have the potential to bring about change on a regional scale. The report will also assess ecological, socio-cultural, and economic trends and identify risks to the health of the bay.

The State of the Bay report also will identify environmental indicators that are reliable for long-term analysis of change and known risks for their significance to the health of the Bay. Case studies will be included to outline how various communities have made different choices and the implications of those choices. A draft of this report will be circulated in late April. A final draft will be developed in June, with printed versions available in September, 1995. The State of the Bay report will be used to generate public awareness of Penobscot Bay and to advance the concept of an interconnected watershed by identifying broadly-defined cultural, economic and ecological trends.

Other trend information and initiatives also are available. In the mid 1980s, the Department of Inland Fisheries and Wildlife documented the location and quality of habitat for wildlife species within Penobscot Bay. The Penobscot Bay Conservation Plan (IF&W, 1987) has provided invaluable information on the status of species within the Bay. Recently, much of this information, together with available updates, has been digitized for inclusion in an oil spill preparedness model developed by the DEP. The base information is available, however work still needs to be done to translate it into meaningful information for resource managers, planners and decision-makers.

The Penobscot Bay Conferences and their proceedings have documented these issues. In 1993, presenters developed region-specific information on a variety of issues. Individual presentations were followed by roundtables and discussions that are documented in the proceedings (see Appendix C).

4. Cause and Effect Relationships are Identified or Methods for Further Work or Needs

The complexity of the Penobscot Estuary's ecosystem and the difficulty in distinguishing anthropogenic impacts from natural variability have made it difficult to ascertain the exact causes of many of the environmental problems in the estuary. However, existing data coupled with a knowledge of ecological processes and inferences drawn from studies in other areas make it possible to draw conclusions regarding the causes of various problems.

Data from the Department of Marine Resources indicate that waste water treatment plants, marina activity, licensed overboard discharges, as well as non-point source pollution (failing septic systems and agricultural activity) are responsible for shellfish closures in the bay. DEP files record 388 overboard discharges in the Bay; a high percentage are found on the islands of North Haven, Vinalhaven, and Islesboro (Paul Anderson, per. comm., 3/95).

Coastal development and recreational activity, particularly hiking, camping and picnicking on undeveloped islands, has disrupted colonial seabird, blue heron, common eider, osprey and eagle nesting sites (Inland Fisheries & Wildlife, 1987). Dams and industrial pollution have decimated populations of anadromous fish in the estuary. Toxic contamination of intertidal sediments may effect shorebirds feeding in these areas to build up fat reserves to sustain migration. Use of large, heavy drags may have reduced the scallop population in the Bay to the point where it can no longer sustain a significant commercial harvest. Shellfish closures and declining fish and shellfish stocks have resulted in a loss of jobs for harvesters in the area.

V. Institutional Arrangements

1. Institutional Structures Affecting the Estuary and their Roles

A. Federal Program Presence

This listing of environmental, natural resource, and regulatory agencies and programs is illustrative of the variety of Federal programs that, directly or indirectly, can affect the health of the Penobscot River Basin and Penobscot Bay. This discussion is organized by major department.

Department of Agriculture

Consolidated Farm Services Agency (CFSA)
CFSA, a new agency administering some programs from the former Farmers Home Administration (FmHA) and the Agricultural Stabilization and Conservation Service (ASCS), administers a variety of loan and loan guarantee programs targeted to rural residents, ranchers, and farmers (including aquaculture). These include farm operating and ownership loans, emergency loans following natural disasters, loans to farmers with limited resources, soil and water conservation loans, and direct and guaranteed rural housing loans.

Other CFSA programs include emergency assistance to farmers following natural disasters, assistance to install erosion control measures, and assistance to control nonpoint source water pollution in rural areas.

Extension Service (ES)
ES programs target many issues through a comprehensive educational network that includes state universities and local offices. Issues most pertinent to this project include food safety and quality, revitalization of rural America, sustainable agriculture, waste management, and water quality.

Forest Service (FS)
The FS provides financial and technical assistance to state and private forest landowners to protect and improve the quality of air, water, soil, and open space -- all while encouraging the best use of land and protecting the environment. It also cooperates with other USDA agencies by providing leadership and technical assistance for conservation programs involving forestry.

Natural Resources Conservation Service (NRCS)
The NRCS, formerly the Soil Conservation Service, administers a national natural resource conservation program in cooperation with local landowners and users, local planning agencies, and other governmental agencies at all levels. NRCS also provides assistance in controlling agricultural pollution, improving the environment, and developing rural

communities. These programs are carried out through a close partnership with local Soil and Water Conservation Districts (SWCDs) and Resource Conservation and Development (RC&D) councils.

Major programs include conservation operations, wetlands reserve, watershed planning, watershed and flood prevention operations, forestry incentives, water bank, river basin surveys and investigations, and resource conservation and development. The conservation operations program includes the National Cooperative Soil Survey, Water Quality Initiative, resource inventory and monitoring, and conservation compliance activities. See the Kenduskeag Stream Watershed Activities section for an example of special program efforts within the Penobscot River Basin.

Rural Economic and Community Development Service (RECD)
RECD provides technical assistance and credit programs to rural (under 50,000 population) communities for community facilities, water and wastewater systems, and projects for improving the economic and environmental climate of the area.

Department of Commerce

National Oceanic and Atmospheric Administration (NOAA)
As its name implies, NOAA has comprehensive responsibilities for the exploration, management, use, and conservation of the ocean and its resources. Some of NOAA's marine scientific-related missions include monitoring coastal water quality, fisheries stock assessment, and global climate change research. The agency has administrative and management responsibilities concerning fisheries, marine mammals, endangered marine mammals, coastal zone management, marine sanctuaries, and estuarine reserves.

Through the National Marine Fisheries Service (NMFS), NOAA administers programs related to the protection and use of living marine resources and habitats. It is responsible for the protection of marine mammals and endangered marine species.

NOAA, in partnership with EPA, provides Federal leadership for wise and balanced use and management of the coastal zone through the Coastal Zone Management Act. Reauthorization amendments to that act will be significant to the future of coastal zone nonpoint source pollution control within the Penobscot Bay estuary. NOAA supports the Maine Coastal Program.

Department of Defense

U.S. Army Corps of Engineers (USACE)
The USACE is responsible for civil works projects related to rivers, harbors, and waterways. It administers laws for the protection and preservation of navigable waters and related resources, including wetlands, and also assists in the recovery from natural disasters.

The USACE is responsible for permitting dredge and fill projects and undertaking federal maintenance dredging projects.

U.S. Navy

The U.S. Navy has a facility in Searsport for offloading JP 5 fuel from vessels and transferring it to tank trucks for transport to Brunswick Naval Air Station. As a result of the marine transport of oil, the U.S. Navy develops contingency plans and stockpiles equipment to respond to an oil spill in marine waters.

Department of the Interior

U.S. Fish and Wildlife Service

The USFWS has broad responsibilities for endangered species, migratory birds, inland sport fisheries, certain marine mammals, and specific fishery and wildlife research activities. The USFWS carries out this role, in part, through research or by providing advice and recommendations to other state and federal regulatory agencies on the effects of particular projects on fish and wildlife resources.

Habitat preservation and resource management programs are essential to their efforts toward restoration of coastal anadromous fish, including several native to Penobscot Bay. The agency supports two National Fish Hatcheries in the vicinity, both of which raise Atlantic salmon for stocking in area rivers. The Craig Brook hatchery is in Orland and the Green Lake hatchery is in Ellsworth, just east of the project area.

An especially high priority project for the Service in the Gulf of Maine is the ongoing effort to protect valuable coastal islands. Working with the Maine Department of Inland Fisheries and Wildlife and non-governmental conservation organizations, the Service has identified over 300 islands (roughly 10 percent of all coastal Maine islands) that rate especially high for migratory birds including colonial seabirds and wading birds, shorebirds, waterfowl, and neo-tropical migrants. Wildlife on approximately two-thirds of these islands have already been permanently protected by landowners, or non-profit, state or federal organizations. Ongoing efforts are focused on securing protection for the remainder using various strategies, such as conservation easements, technical assistance, resource management recommendations and actions, and acquisitions. Some of these islands are located in Penobscot Bay.

U.S. Geological Survey (USGS)

The USGS has primary responsibility for investigating the Nation's land, water, mineral, and energy resources. It conducts assessments of the quality, quantity, and use of surface and ground water resources and publishes both popular and technical reports on its findings. Close cooperation is maintained with state agencies with similar responsibilities. Water data is collected on a regular basis from about 10 sites within the interior parts of the project area.

National Park Service (NPS)
A portion of Acadia National Park (Isle au Haut) is within the proposed boundaries of the Penobscot Bay Estuary Project. In addition, Acadia National Park holds numerous conservation easements in proximity to the park to protect the scenic integrity of Acadia National Park's surroundings.

Department of Transportation

United States Coast Guard (USCG)
The USCG is our major maritime law enforcement agency. It assists in the enforcement of laws pertaining to living and nonliving marine resources. Through a marine environmental response program, it is responsible for enforcing sections of the Federal Water Pollution Control Act and other laws directly relating to the marine environment, including the Penobscot Bay area. The USCG is responsible for pollution prevention and contingency planning for maritime transportation of hazardous products. The USCG also maintains a comprehensive system of marine navigational aids.

U.S. Environmental Protection Agency

The United State Environmental Protection Agency (EPA) researches, monitors, sets standards for pollution discharges, implements, and enforces the nation's environmental laws. In the marine environment, EPA regulates industrial and municipal discharges, ocean dumping and aquaculture, and develops best management practices for nonpoint sources of pollution.

Sea Grant Program

Recent Sea Grant and related research conducted in Penobscot Bay includes a study on the environmental effects of salmon net-pen aquaculture and developing and applying a physical circulation model used in the environmental regulation of net-pen aquaculture. Monitoring three study sites, researchers found that salmon net-pen aquaculture had limited negative environmental impacts on the ocean bottom. They then developed a model that is being used to make decisions about siting net-pen facilities. Although there is currently only one aquaculture operation in Penobscot Bay, several other ones are proposed. This kind of scientific information is needed to make informed management decisions on the siting, capacity, and monitoring of net pens.

Ten years ago, a Sea Grant study was conducted in the Penobscot River to determine if juvenile American eels (elvers) use tidal currents to travel up the estuary during their spring migration and where they are positioned in ebb and flood tides. Sea Grant also funded a study of the estuary's circulation patterns. By understanding the physical processes of the Bay, researchers are better able to predict the transport of pollutants, marine organisms, and sediments within the estuarine environment.

In 1980, Sea Grant-approved marine geologists found that trace metal values in sediments were equal to natural or pre-industrial values, indicating that the Penobscot estuary had been less affected than other study sites by trace metal input from human-induced activities. However, a survey conducted of Penobscot Bay in 1983 by a researcher at the Bigelow Laboratory showed chromium, copper, and lead concentrations in the bay were comparable to levels from sediments at New England sites which are far more industrialized. The study also revealed that the highest concentrations of most metals were found at the head of the bay, suggesting that river flow is a major pathway for contaminants into the marine environment.

Besides Sea Grant projects conducted in Penobscot Bay, many others have had an impact on Penobscot Bay. One notable example is the control of red tail (gaffkemia), a fatal bacterial disease that attacks lobsters held in pounds or cars. A Sea Grant researcher developed a pelleted, medicated feed that is used in pounds throughout Maine and the Canadian Maritime provinces, with the result that lobster mortality by gaffkemia has been virtually eliminated. Since most of Penobscot Bay is in Knox County, the top lobster-producing region in the state, this research has had significant impacts on the Bay.

Penobscot Indian Nation

The Penobscot Indian Nation has lived within the Penobscot Bay region for over 10,000 years. Currently, their holdings within the proposed region include Indian Island, within the Penobscot River. The Penobscot Indian Nation enacts and enforces their own land use and environmental requirements covering their lands. They are modeled after Maine's requirements. The Penobscot Indian Nation has 80 water quality monitoring stations along the river that are monitored in collaboration with DEP.

B. State

This section briefly describes the various state agencies with jurisdiction over Maine's marine environment. Several agencies that regulate activities that effect marine resources are included as well. This section is adapted from Catena, 1992.

The **Department of Environmental Protection** (DEP) is the major environmental regulatory agency for the state, preventing damage to the environment from pollution and development. The Department directs programs concerning air and water pollution, solid and hazardous waste, dredge and fill of coastal wetlands and land use. Its major functions affecting the marine environment include environmental review and permitting of aquaculture leasing, submerged land leasing, dredge and fill activities, and dredge spoil disposal, water quality classification, oil terminal licensing, oil spill response, planning for nonpoint source pollution control, coastal wetlands regulation, oversight of shoreland zoning and marine pollution monitoring. DEP contributes staff and resources to the Casco Bay Estuary Project.

The **Department of Marine Resources** (DMR) was established to conserve and develop the state's marine and estuarine resources by conducting and sponsoring scientific research, promoting and developing the Maine commercial fishing industry, advising and cooperating with other government agencies concerning development or activity in coastal waters and by implementing, administering and enforcing the marine resource laws of the state.

The **Department of Inland Fisheries and Wildlife** (IF&W) is charged with ensuring that all species of wildlife and aquatic resources are maintained and perpetuated for their intrinsic and ecological values, for their economic contribution and for their recreational, scientific and educational value. IF&W enforces regulations governing inland fishing, hunting, trapping, propagation and stocking of fish, acquisition of wildlife management areas, the registration of recreational vehicles and issuing licenses and permits.

Coastal and marine activities include registering watercraft, inventories and management of significant wildlife habitats, including seabird and marine mammal habitats, protection of and research on endangered and threatened wildlife, including bald eagles and environmental assessment and review of proposed coastal development projects. IF&W also manages the inland freshwater habitats of anadromous and catadromous fish.

The **Department of Economic and Community Development** (DECD) is responsible for business attraction and assistance, tourism development and management, community development and comprehensive land-use planning. The Office of Community Development is responsible for implementing and administering Maine's Growth Management Laws. The Office reviews comprehensive plans and provides a wide range of technical assistance to local governments. The Office also provides technical assistance and funding to coastal communities for the preparation and administration of local land use ordinances, public access planning and harbor management. DECD also houses the Natural Areas Program which inventories and identifies rare and endangered plants and animals, as well as significant plant communities.

The **Department of Agriculture, Food and Rural Resources** (AFR) has jurisdiction over Maine's agricultural resources. The agency houses the State Soil and Water Conservation Commission to protect, use properly, maintain and improve the state's soil, water and related natural resources. The Commission's primary responsibility is to help local Soil and Water Conservation Districts implement their locally-developed soil conservation programs.

The **Department of Conservation** (DOC) preserves and protects the land and water resources of the state. DOC is divided into 5 bureaus with numerous functions that affect the marine environment:

The Land Use Regulation Commission (LURC) -- This Bureau regulates the unorganized areas of the state particularly for land use. LURC has jurisdiction over several islands in Penobscot Bay including Mohegan and Matinicus.

The Bureau of Parks and Recreation (BPR) -- This Bureau manages the State's Park lands. Major state parks in the Penobscot Bay area include the Camden Hills State Park and Fort Knox in Bucksport.

The Bureau of Public Lands (BPL) -- BPL is responsible for the management and administration of Maine's 3.5 million acres of offshore submerged lands and about 1,500 state-owned islands. BPL's jurisdiction is from the low-water mark to the 3-mile state limit. The Bureau's goal is to manage submerged lands to provide the greatest long-term benefit for the people of Maine. BPL issues leases or easements for wharves, docks, cables, dredging, filling, or other activities on submerged lands.

Maine Geological Survey (MGS) -- MGS maps, interprets, publishes geologic information and provides geologic advice for planning and regulatory agencies. MGS researches the marine geology of the Gulf of Maine, maps mineral resources off the coast of Maine, and provides technical services to other state agencies involved in the coastal zone, including technical review of dredge and fill permits, coastal sand dune activities and other submerged lands activities.

The Bureau of Forestry (FOR) -- This Bureau has jurisdiction over the State's forest lands and manages forest practices on private lands. The Bureau has published and promotes Best Management Practices for forestry to minimize soil disturbance and erosion.

The **Department of Transportation** (DOT) plans and develops the State's transportation facilities. For marine-related transportation, the DOT acquires, constructs, operates and maintains harbor facilities to support the development of coastal resources, ports and harbors. It also operates and maintains port and water transportation facilities. The Maine Port Authority within DOT, initiates, and implements programs to develop, expand and use ports and port facilities in Maine. A Ports and Marine Transportation Division directs planning studies of cargo handling facilities at Maine ports, performs safety inspections, maintains the Casco Bay Island Transit District, and oversees the State Ferry Service. The division also markets Maine ports and analyzes port traffic and construction.

The **Executive Department** has several components that have marine-related activities. These include:

The Land and Water Resources Council (LWRC) -- This council is composed of the commissioners of the natural resource agencies within Maine. The LWRC is charged with advising the Governor, the Legislature and state agencies on the development of comprehensive, integrated land and water resources planning and management programs for the state. Six policy committees carry out the policy development work of the Council including the Marine Policy Committee.

The Marine Research Board (MRB) -- Housed within the Maine Science and Technology Commission, consists of a broad spectrum of marine interests from throughout the state.

The MRB is charged with developing a biennial priority statement and action plan of marine research needs of the state. The MRB is authorized to develop and administer a competitive, merit-based grant program to address research needs of the state, however funds have not been appropriated to date.

The Maine Coastal Program (MCP) -- The MCP strives for a balance between coastal resources and their wise utilization for the economic benefit of the State. The program funds several agencies and local governments to address various coastal issues. Local governments use these grants to support local land use issues, economic development, recreation and access and marine resources management.

The **Maine State Pilotage Commission** provides a system of state pilotage to protect lives, public health, property and vessels entering or leaving the coastal waters of the state. The commission establishes qualifications for pilots and conducts examinations for pilots in all coastal waters of Maine.

The **Finance Authority of Maine** (FAME) assists business development and provides new employment opportunities throughout the state. FAME accomplishes its goals through a wide variety of programs ranging from traditional loan insurance to project grants for research and technological innovation. FAME offers a low interest loan program for the removal and replacement of underground oil storage tanks to help facilitate the removal of old tanks. The Natural Resources Division provides affordable capital and other financial assistance to natural resource-based businesses, including fisheries-related businesses. The division supports investments in docks, piers, seafood processing and fishing vessels.

The Overboard Discharge Replacement Program within FAME provides 100% loan insurance to lenders for a business' removal, rehabilitation, or replacement of overboard discharge systems that discharge into the marine environment.

The **Department of Human Services** (DHS) is responsible for public health among a myriad of other duties. The Division of Health Engineering establishes the standards for, and permits, waste water disposal facilities. Their Drinking Water Program regulates drinking water and oversees the state's well head protection program. The Environmental Health Program assesses the contamination of fish and wildlife with toxins, dioxin, or metals and issues advisories if those levels are too high for safe human consumption.

The **Maine Historic Preservation Commission** (MHPC) is responsible for encouraging the preservation and restoration of our rich cultural heritage. The MHPC administers the National Register of Historic Places, has had a grants program to restore historic properties, and conducts surveys and inventories of historic resources. An archaeologist is on staff to inventory and protect archeological sites including hundreds of shell middens and evidence of pre-European settlement along Maine's coast.

Cooperative Extension is the primary outreach program of the land grant University of Maine. Offices staffed with extension educators and backed by state specialists serve each of Maine's 16 counties, 5 of which touch on Penobscot Bay. With its traditional programs in sustainable agriculture, family and youth development, CE's mission is to help people use research-based information in ways they determine will improve their lives. Based on local needs, Extension educators have played increasing roles in establishing volunteer water quality networks and in helping regional efforts to plan for sustainable development.

Since 1991, Cooperative Extension has played a visible and supporting role in the planning of the two Penobscot Bay conferences and in the ongoing work of the Penobscot Bay Network. At the same time, through training and support for local volunteer water quality networks, Extension educators have applied research in water resources and testing as well as in community and leadership development to insure local ownership and long terms viability of those projects. Extension water quality specialists produce statewide and regional newsletters to address best management practices for agricultural producers and homeowners. The Tanglewood 4-H Camp and Learning Center, and outreach efforts in the Penobscot Bay Watershed, provide a variety of youth and adult environmental education. Cooperative Extension is also a co-sponsor of Penobscot Riverkeepers 2000.

C. Local/Regional

Penobscot Valley Council of Governments -- PVCOG provides planning and technical assistance to 73 towns in the Penobscot Valley. It helps municipalities with solid waste planning, coastal planning, cooperative purchase programs and transportation issues.

Mid-Coast Regional Planning Commission -- MCRPC provides planning and technical assistance to municipalities within mid-coastal Maine on planning and economic development issues.

Hancock County Planning Commission -- HCPC advises municipalities within Hancock County on local planning issues and problems.

Municipalities -- The 43 municipalities within the proposed study area have jurisdiction over general land use issues through subdivision ordinances, shoreland zoning ordinances, and site plan review ordinances. Twenty six of these communities have developed a comprehensive plan since the 1988 Growth Management Act. Approximately 10 of the municipalities within the region have townwide zoning (S. Cole, DECD, pers. comm. 3/95). Maine has a strong tradition of home-rule authority with little land use regulation at the regional level.

Enforcement of private wastewater treatment systems is done by a town's licensed Plumbing Inspector. The Code Enforcement Officer enforces local land use ordinances.

D. Non-Governmental Organizations

Island Institute – The Island Institute serves as a voice for the balanced future of Maine's islands and carries out its mission through publication services and community, marine resource and stewardship programs. With over 3000 islands along the coast of Maine, the services of the Institute are offered to both the year-round island communities, through the schools program, economic development efforts and municipal services, and to the undeveloped islands through conservation initiatives and resource management plans. The Island Institute believes that preserving Maine's coastal and island heritage is inextricably linked to maintaining the social and economic framework which has helped to sustain this distinct landscape. The Island Institute has been committed to the efforts of the Penobscot Bay Network since its inception.

Penobscot Bay Land Trust Alliance – PBLTA is an alliance of 9 local land trust within the Penobscot Bay region. Member trusts coordinate efforts on regional conservation issues and pursue projects of mutual interest. By creating a model for coordinated community regional conservation efforts, the PBLTA has opened up new opportunities for raising funds and exchanging information. Local Land Trusts are: Islesboro Islands Trust, Castine Conservation Trust, Island Heritage Trust, Coastal Mountains Land Trust, Georges River Land Trust, Belfast/Northport/ Lincolnville Land Trust, Blue Hill Heritage Land Trust, Isle au Haut Conservation Trust, and Vinalhaven Land Trust. Appendix B documents each land trust's holdings.

The Nature Conservancy – TNC identifies and protects rare and endangered plants and animals usually through purchase of their habitat. TNC owns numerous islands and properties within Penobscot Bay.

Maine Aquaculture Innovation Center -- The Maine Aquaculture Innovation Center promotes aquaculture statewide, through advocacy and education. The MAIC is jointly funded by industry and the State of Maine. The MAIC also promotes coastal access for marine-dependent uses and provides technical information to its constituents.

Maine Coast Heritage Trust – MCHT works to protect land that is essential to the character of Maine, particularly along its coastline, lakes and rivers. MCHT assists landowners who want to voluntarily protect significant land resources. MCHT has been instrumental in helping Acadia National Park acquire many of its conservation easements.

Penobscot Marine Museum -- This museum educates the people of Maine about their marine heritage and the history of the Town of Searsport. The Museum has exhibits and collections about Penobscot Bay's past coastal industries and residents. The museum sponsors lectures, workshops and a fall conference. The education department provides outreach and on-site educational programs for students.

Maine Island Trails Association – MITA has developed and maintains a 325-mile long waterway for small self-propelled watercraft, and small sailboats and motorboats. Members use the islands in a manner that has little or no impact on the natural environment by using cook stoves

instead of open fires, building their fires below the high tide line camping in grassy areas, and carrying out all waste and rubbish. Special consideration is given to wildlife and bird breeding islands. The MITA takes advantage of small state-owned islands along most of the route. Other islands, including privately owned ones, are also in the Trail system. MITA has over 2500 members. Over 70 islands along Maine's coast are part of the trail. Fifteen of these are within Penobscot Bay.

Penobscot River Oil Spill Prevention Action Committee -- PROPAC is an oil spill cooperative formed by the major oil transporters within the river. It consists of about ten members who have joined together to strengthen their capabilities. PROPAC conducts oil spill drills and response exercises within the Bay.

Rockland Marine Debris Council -- Members of the Rockland community have established a marine debris council as part of the Gulf of Maine Council. They formed out of a need to broaden public understanding about marine debris and water quality issues. With funding from the Gulf of Maine Council and the local community, the Council has acquired and placed a waste oil igloo along the waterfront, posted outdoor metal signs at all wharf locations in the area, and distributed informational brochures about the Marine Debris Council.

Fishermen's Forum -- The Fishermen's Forum is a Penobscot Bay-based organization that holds annual conferences to discuss issues for the Maine fishing industry. Seminars, workshops and panel discussions focus on resource issues, government programs or requirements and business opportunities or problems. The 3-day conference boasts attendance of over 800 people daily.

E. Educational

University of Maine -- The University of Maine (UM) and its coastal laboratory, the Darling Marine Center, have a broad set of capabilities and expertise which can be brought to bear on the marine resources and environmental quality of Penobscot Bay. These range from physical, chemical, and biological oceanography, through marine biology, ecology, and geology, to the socio-economics of coastal fisheries and communities.

Several UM science and engineering faculty are continuing to develop circulation and wave models applicable to Maine's coastal waters and embayments. In addition, a diverse group of UM faculty at Orono and the Darling Center have well-developed and continuing programs focused on various aspects of intertidal, and shallow-, and deep-water benthic ecology and habitat. Finally, a group working out of the Darling Marine Center has recently begun a long-term effort to understand the ecosystem functioning of mid-coast Maine estuaries. Their initial emphasis is on determining the time-varying character and distribution of the living and non-living particles in the water column of these estuaries. And, they are trying to learn how such factors as mixing, stratification, nutrients and ambient light control the genesis, transport, and fate of these particles. The scientific information from these programs will provide a sound basis for managing and developing both our culture and capture fisheries. The same information is essential to assessing

the impacts of coastal development on the intertidal, estuarine, and benthic ecosystems and the important resources and economic activity that they sustain.

Maine Maritime Academy -- MMA specializes in ocean- and marine-oriented programs at the undergraduate and graduate level, with emphasis on engineering, transportation, management and ocean science. The Corning School of Ocean Studies includes a program of teaching and research on Penobscot Bay.

Penobscot River and Bay Institute -- An educational network of teachers who work with their communities to learn about and take care of their river. The long-term mission is to promote understanding and stewardship of the Penobscot River and Bay watershed, and to foster a healthy environment and culture for the citizens of the 21st century. About 100 teachers use curriculum developed by the Institute and participate in programs such as Expedition 2000.

Penobscot Riverkeepers 2000 -- The Penobscot Riverkeepers 2000 project is a cooperative project of the University of Maine, Unity College, the Penobscot Nation, Atlantic Center for the Environment, the Penobscot Institute, and communities and schools of the Penobscot watershed.

This organization promotes understanding and stewardship of the Penobscot watershed to cultivate a healthy river environment for the 21st century. The Penobscot Riverkeepers 2000 goals are to develop an ongoing interactive network of learning and sharing among teachers in watershed schools; conduct an annual Penobscot Riverkeepers Expedition down the entire length of the river; cultivate community educational events and celebrations around the past-present-future of the Penobscot River and Bay watershed; and facilitate and encourage ongoing cooperation, linking, and learning among the many river interest groups.

Penobscot Riverkeepers 2000 continues to evolve from a shared vision of on-the-river education through a cooperative umbrella of public and private partnerships, committed to cultivating grass roots learning and sharing for beneficial action throughout the Penobscot River and Bay watershed.

2. All Major Laws, Regulations, Policies and Control Programs along with a Short Description of Roles and Limits of Each

Because of the extensive regulatory framework within Penobscot Bay, this discussion focuses on how various federal, state and local requirements and programs affect the three primary issues of concern for Penobscot Bay that are identified within this proposal.

A. Surface Water Quality[2]

The following laws, regulations, policies and programs affect water quality within Penobscot Bay.

Federal

Clean Water Act -- EPA permits individual discharges that meet federal standards through the National Pollution Discharge Elimination System (NPDES). Maine has not sought delegation from the EPA, thus dischargers also must obtain a state waste discharge license from the Maine Department of Environmental Protection. Twelve municipal wastewater treatment plants receive 301(h) variances to discharge into the ocean or rivers with a high volume of tidal flow.

The U.S. Army Corps of Engineers (USACE) has federal jurisdiction over dredge disposal sites pursuant to section 404 of the Clean Water Act. A dredge disposal site has been designated in the Rockland area of Penobscot Bay.

The USACE also permits alterations to wetlands, regardless of size. (Refer to section B for wetland regulation in Maine.)

Rivers and Harbors Act -- The USACE requires permits for dredging or disposal of dredged material affecting navigable waters through section 10 of the Rivers and Harbors Act.

A. Kenduskeag Stream Watershed Activities

The 215 square mile Kenduskeag Stream watershed is located northwest of Bangor, where it enters the Penobscot River. This intensively farmed area contains only about 2 percent of the Basin's land area but over 40 percent (16,500 acres) of its agricultural land. Most farms are on or near the stream or its tributaries. Nonpoint source pollution (animal waste, nutrients, and sediment) from farmland and residential development near Bangor degrades the water quality, fishery, and recreational use downstream.

Seasonal and runoff event stream monitoring indicated that dissolved oxygen (DO) was as low as 10 percent saturation, and typically from 20 to 60 percent. Live fecal coliform counts always exceeded 200 colonies per milliliter (ml) and were as high as 33,000 colonies per ml. High nitrogen, phosphorus, and sediment levels generally were event related. Coliform bacteria and algae are local problems when water is warm and flow is low. However, summer storm events quickly flush large numbers of live bacteria to the River and Bay where they negatively affect shellfish beds and other resources.

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[2] Sections of this discussion were adapted from MLI, 1992 and DEP, 1994.

The Penobscot County Soil and Water Conservation District (PCSWCD) and the Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS), developed the Kenduskeag Stream Watershed Plan in 1988. The plan recommended implementation, over a 10 year period, of best management practices (BMPs) on dairy farms, cropland, and critically eroding areas to protect the watershed's land and improve water quality.

USDA's Small Watershed Program, under the authority of Public Law 83-566 and through long-term contracts with landowners or operators, provides half of the implementation costs of these measures. Local (non-Federal) funds provide the remaining half. NRCS also provides technical assistance, such as design and construction inspection, at no cost to program participants.

The Agricultural Stabilization and Conservation Service (ASCS), now part of CFSA, utilized its Agricultural Conservation Program (ACP) to supplement the watershed project efforts. About 30 long-term agreements were signed with landowners or operators. These agreements provided a 75 percent Federal cost share for land treatment and water quality improvement measures within the watershed. Agreements amounting to over 2 million dollars have been signed to date.

State

Maine Protection and Improvement of Waters Act -- Maine does not have EPA approval of its water quality program and is one of only a handful of states that has not been delegated authority to issue NPDES permits. Consequently, Maine has a separate licensing program for the discharge of pollutants. All direct or indirect discharges require a permit. Exemptions from licensing discharges include certain types of snow dumps, road sand or salt storage piles, aquatic pesticides applied by IF&W, and licensed aquaculture projects. DEP will soon seek delegation of the NPDES permitting program and has formed a task force of public and private interests to assist the agency.

Maine has established three classifications for marine and estuarine waters. Class SA waters are the highest classification and include waters that are outstanding natural resources to be preserved. Direct discharges of pollutants are prohibited in Class SA waters. Class SB waters allow discharges that do not impair estuarine or marine life, and receiving waters must be able to support all indigenous estuarine and marine species without changes to the resident biological community. New discharges that would cause the closure of shellfish beds are prohibited. Class SC waters can receive discharges provided that the Clean Water Act fishable/swimmable standards are maintained.

The Rivers Act -- In 1982, the Maine Legislature designated allowable uses of river segments through the Maine Rivers Act. This act classified rivers based on their use and water quality and set forth allowable levels of discharges and use.

Overboard Discharge Law -- In 1987 and 1989, the Maine Legislature prohibited new overboard discharges (OBD) and expansions of existing, licensed discharges; required DEP

to inspect the facilities annually; and established an OBD Removal Grant Program. For any licensed discharge to a shellfish growing area which causes a nuisance or for which an alternative is available, a conditional license is issued which expires 6 months after the offer of grant assistance by DEP.

Successful bond issues in 1989, 1990, 1992, and 1993 have resulted in $3.5 million available for this program. DEP grants pay up to 90% of eligible costs for year-round residential replacements, 50% for commercial replacement systems, and 25% for seasonal residential replacement systems. About 135 OBD systems have been replaced statewide to date, primarily from shellfish growing areas. In FY 1994, Penobscot Bay communities received $313,825 for removal of overboard discharges through this program. This represents one third of the program's expenditures for the year.

The Finance Authority of Maine offers loan guarantees for commercial facilities that replace their OBD systems.

Site Location of Development Law -- Maine regulates development over 20 acres in size, buildings over 60,000 sq. ft. in size or projects that result in more than 3 acres of non-revegetated land. The Site Location of Development Law reviews proposed developments for surface water quality, ground water resources, nutrient loading, impacts on wildlife habitat and resources, and aesthetics, among other effects. Applicants are required to prepare sediment and erosion plans for the project as part of their permit.

Small Community Grants Program -- Maine helps finance small wastewater treatment projects through the Small Community Grants Program. Enacted in 1981, the program allows up to $1 million per year to be spent financing up to 90% of the cost of small wastewater treatment systems. Only $100,000 per year may be spent in any one town. Areas are chosen based on a priority ranking system. This program addresses smaller systems than those eligible for the Federal Revolving Fund Program. Since its inception in 1981, the program has constructed nearly 2300 small systems in 155 towns, spending nearly $12 million in grant funds. Rockport, Searsport, St. George, Stockton Springs and Lincolnville received grants totaling over $58,000 from this program in FY 1994.

Maine Combined Sewer Overflow Program -- Thirty-nine Maine communities are served by combined sewer systems, five of which are in Penobscot Bay. An additional 15 towns statewide have stormwater related overflows that are similar to CSOs. In coordination with EPA, Maine assists communities in evaluating the design, condition, activity and effects of combined sewer systems and overflows. By the end of 1993, 25 communities had been awarded CSO planning grants and 8 communities had submitted sewer system master plans. CSO planning grants pay up to 25% of the cost of the plan. Two bond issues have provided $4.8 million to fund this program. In FY 1994, Bucksport, Castine and Orono received $31,269 under this program, approximately 15% of the total funding.

Surface Water Ambient Toxics Program -- In 1994, the Legislature provided $670,000 to monitor Maine's surface waters for the presence of toxics. This program builds off EPA's REMAP program and the state's dioxin monitoring program to assess toxic contamination to Maine's inland lakes and streams and marine waters.

Best Management Practices -- The DEP has researched and published best management practice guides for agriculture, forestry, construction, and other topics.

Soil and Water Conservation Districts -- In Maine, Soil and Water Conservation Districts review erosion and sedimentation plans required of agricultural operations that result in a discharge.

Boat pump-out program -- Marinas are required by Maine law to have pump-out facilities on site, however this requirement is not enforced. Maine still does not have an adequate number of sewage pump-out stations. The Maine Coastal Program has received a grant from the U.S. Fish and Wildlife Service to help Maine increase availability. The Coastal Program will assess the need for facilities and help marinas install n ew pump-out facilities with the help of 75% grants. Twenty new facilities will be installed by 1995, with an additional 20 expected between 1995 and 1997. Broad public awareness efforts are also a component of this program.

Local

Local efforts to address water quality are primarily afforded through municipal land use controls and permitting.

Shoreland Zoning -- Shoreland zoning requires setbacks, minimum lot sizes and other requirements within 250 feet of any shore. Shoreland zoning also limits lot coverage to 20%, except in general development or commercial fishing districts. New development must minimize stormwater runoff in excess of natural pre-development conditions, retain natural swales and gulleys, revegetate disturbed soil submit soil erosion and sedimentation control plans to local governments, install and maintain run-off and stabilization measures.

Municipal Subdivision Law -- Municipal Subdivision Law requires municipal approval and review of parcels of land that are divided into 3 or more parcels within 5 years. This law requires the municipality to review a proposed subdivision for its impact on water quality, soil erosion, stormwater run-off, and other parameters.

Site Plan Review -- Most towns regulate development that exceeds a certain threshold in size. This allows review of a proposed project's stormwater run-off system, water quality impacts and other potential effects.

Growth Management -- Growth management measures, including strategies to address nonpoint source pollution and other water quality issues may be implemented by local

governments through comprehensive plans under the Maine Growth Management and Land Use Planning Law. State funding is available for many municipalities to prepare and update their comprehensive plans. The Department of Economic and Community Development provide towns with technical assistance on these plans.

Municipal permitting of small discharges -- In Maine, municipalities are empowered to permit discharges of less than 2500 gallons per day of treated domestic wastewater. However, this will be changed if the State is empowered to grant NPDES permits.

Water Quality Monitoring -- Citizen monitors in seven Penobscot Bay communities are studying the quality of marine and estuarine waters and feeder streams as part of the Shore Stewards Partnership, a statewide network of more than twenty volunteer monitoring groups. For these communities, goals of the monitoring program are three-fold: 1) to investigate and mitigate pollution problems at the local level; 2) to work with the Department of Marine Resources to help classify shellfish growing areas; and 3) to establish (in the absence of routine government monitoring) important baseline data for Penobscot Bay.

These local efforts are supported by the Shore Stewards Partnership, a joint effort of State Planning Office/Maine Coastal Program, the University of Maine Cooperative Extension, the Maine Department of Marine Resources, the Maine Department of Environmental Protection and the Maine Community Foundation. Groups received start-up funds for equipment and supplies through a grants program administered by the Maine Community Foundation. State agency and Cooperative Extension personnel assisted the groups with start-up, trained volunteers in sampling and analysis techniques and provide ongoing support.

Community and environmental groups involved are: The Islesboro Islands Trust, the Castine Conservation Trust, the Coastal Mountains Land Trust, Deer Isle Conservation Commission, and the Stonington Conservation Commission. Schools involved include Islesboro Central School, Camden/Rockport High School, Deer Isle/Stonington High School, George Stevens Academy, Vinalhaven High School, North Haven Community School, and the Maine Maritime Academy.

Adult volunteers from each of the sponsoring groups work jointly with students to conduct water quality studies, create reports, communicate information to state and local officials and publicize results in the community. Coastal waters and feeder streams are tested for temperature, pH, salinity, dissolved oxygen, transparency and fecal coliform bacteria. Samples are processed in laboratories that have been set up at area schools. A smaller group of volunteers have received additional training in shoreline survey methods and have been working with DMR to update sanitary survey information.

In Deer Isle/Stonington, about 25 people monitor 18 sites in Northwest Harbor, Mill Pond, Long Cove, Lily Pond stream, Crockett Cove, Burnt Cove, Fish Creek and Stonington. The

program is entering its fourth season. In 1993, Partners in Monitoring volunteers were instrumental in reopening the majority of Crockett Cove to shellfishing. The group assisted the Department of Marine Resources in conducting a shoreline survey of the area, and through their sampling efforts, helped DMR attain their required number of samples for reclassification of the area. Crockett Cove had historically been important to shellfishermen, but had been closed since 1990 and 1991 tests showed high levels of fecal coliform bacteria.

The Bagaduce Water Watch (a project of the Castine Conservation Trust) collects baseline data on 10 sites in the Bagaduce River and Penobscot Bay. Volunteers logged 527 hours of volunteer time during 33 weeks of sampling in 1993, their first season. The BWW also conducted a preliminary shoreline survey of the Castine coastline. BWW shares their data with the DMR, the Castine Code Enforcement Officer, and the Castine sewer treatment plant. In the spring and summer of 1993, members of the Environmental Club at George Stevens Academy assisted BWW volunteers with all aspects of the monitoring program. In 1993, BWW identified four areas with high fecal coliform counts and has targeted these areas for additional investigative work.

The Islesboro Water Quality Club has been monitoring 8 sites around Islesboro and is entering its fourth season of work. More than 14 adults and several students have been active in the program. Sites monitored included Big Broad Cove, the Ferry Landing, Crow Cove, Sprague's Beach, the yacht club, Meadow Pond inlet stream and Ryder's Cove. Students as young as 5th and 6th grades have learned about the techniques involved and the purpose of water quality monitoring. Preliminary analysis of Islesboro's data showed high fecal coliform counts in several locations. The group will be working to document pollution sources and to further correlate their results with rainfall data. The Islesboro group has also established themselves as a "rapid response team" for islanders reporting suspected pollution problems.

Teacher Rob Lovell at Camden-Rockport High School is energetically spearheading this mid-coast project; fifteen adults and 25 to 30 students are collecting and analyzing data in the program. Students are monitoring a variety of locations in Megunticook River and lake, including Shirt Tail Point, Barrett's Cove and the tannery. In Camden Harbor, monitoring sites have included Laite Beach, Wayfarer Cove, Sherman's Cove, the channel and the waterfall. In three years of monitoring, the group plans has increased the number of sites monitored to thirty.

A new joint monitoring program involved Vinalhaven and North Haven adults and students is currently gearing up to begin sampling in April of 1995. Fox Island CLAMS (Communities Learning About Monitoring Seawater) will be documenting pollution sources in shellfish growing areas and working with DMR to perform shellfish population surveys and shoreline surveys.

Through a project of the Wells Estuarine Research Reserve, each of the schools will be involved in a telecommunications network, allowing them to send E-mail, to post and transmit water quality data and receive compiled data for Penobscot Bay. Volunteers will also begin in Spring 1995 to use MURPHY, a software program for management of citizen generated data. Use of such tools will allow the Maine Department of Environmental Protection in 1996 to use citizen-generated data for its 305B Water Quality Assessment report for EPA.

B. Habitat Loss

Federal

The following federal, state and local laws, regulations, and policy affect wildlife and marine habitat within Penobscot Bay.

Endangered Species Act -- This act prohibits the taking or harassing of any species designated as endangered or threatened. The act also protects the habitat of that species.

Wetlands --The USACE has "General permits" that apply to general classes of activities in wetlands. Under some categories, the USACE requires notice of proposed activities. The USACE screens these permits and has the authority to require individual permits.

The USACE uses a State Programmatic General Permit (SPGP) in Maine where the Maine DEP provides the USACE with permit decisions. The USACE may then authorize work under the SPGP on the basis that the state has reviewed the project and has issued a permit (WRWG, 1994).

Where individual permit applications are required, the USACE requires that wetland impacts be avoided if possible, minimized as much as possible and compensated for in cases where no alternative exists. Three staff are responsible for this program statewide (WRWG, 1994).

The USACE, USFWS, and EPA have decided to significantly alter the way wetlands are regulated on the Federal level within Maine. Under this proposal, the USACE will establish three tiers of projects. Tier 1 projects will have minimal impact and will not require notification to the USACE. Tier 2 projects will be screened by the USACE in consultation with other Federal agencies. Tier 3 projects will require an individual 404 permit. The tiers will be defined based on size of the affected wetland area, however, those sizes have not been determined (WRWG, 1994).

State

Natural Resource Protection Law (NRPA) -- This law defines protected natural resources and controls activities within, on or over those resources. Protected natural resources

include coastal sand dunes, significant wildlife habitat, fragile mountain areas, coastal wetlands, freshwater wetlands over 10 acres in size, great ponds and rivers, streams and brooks. While review of wildlife impacts is allowed within the scope of permitting an activity within a protected natural resource such as a coastal wetland, significant wildlife habitat is not at this time considered a protected natural resource. The law requires that wildlife habitat maps be prepared and accepted through the rule-making process before this habitat is considered protected. Preliminary maps for some seabird and shorebird habitat will soon be proposed.

Maine Endangered Species Act -- The Department of Inland Fisheries and Wildlife can formally propose essential habitats for threatened and endangered species and limit certain activities within these zones. To date, 244 bald eagle nesting sites are designated as essential habitat and require a 1/4 mile setback for any development. Twenty one roseate tern nesting areas also are protected under the Act.

Site Location of Development Law -- Maine regulates development over 20 acres in size, buildings over 60,000 sq. ft. in size or projects that result in more than 3 acres of non-revegetated land. The Site Location of Development Law reviews proposed developments for their impacts on wildlife habitat and resources, among other effects.

Toxics Use Reduction Law -- Maine industries that use, store or dispose of hazardous materials are required to reduce the amount of toxic material they use or dispose of by 10% in 1994, 20% by 1996 and 30% by 1998. The base year for comparison varies depending on the substance, but is sometime in the late 1980s. Preliminary indications are that industries are meeting this requirement. This law is included in this discussion because of the various hot spots of toxic contamination that exist within Penobscot Bay and evidence of species contamination.

Marine Conservation Areas -- The Department of Marine Resources can restrict uses and the taking of specific species for marine conservation within 3 miles of shore (12 MRSA §6171). The DMR has 4 mussel seed conservation areas, 11 seed clam areas and a spawning area closed to the taking of groundfish. Protection effects only harvesting and gear use.

Local

Shoreland Zoning -- Shoreland zoning requires setbacks, minimum lot sizes and other requirements within 250 feet of any shore. Resource protection districts that allow minimal disturbance are required around wetlands that are considered of high or moderate value to waterfowl. A town may designate other significant wildlife areas as resource protection districts and enact other restrictions.

Municipal Subdivision Law -- Municipal Subdivision Law requires municipal approval and review of parcels of land that are divided into 3 or more parcels within 5 years. This

law requires the municipality to review a proposed subdivision for its impact on wildlife habitat.

Site Plan Review -- Most towns regulate development that exceeds a certain threshold in size. This allows review of the proposed project's impact on wildlife habitat.

Growth Management -- Growth management measures, including strategies to protect significant wildlife habitat may be implemented by local governments through comprehensive plans under the Maine Growth Management and Land Use Planning Law. State funding is available for many municipalities to prepare and update their comprehensive plans. The Department of Economic and Community Development provide towns with technical assistance on these plans.

C. Economic Development

Economic development is not regulatory in approach thus the following discussion outlines the various programs and organizations available in the region.

Federal

Economic Development Administration -- EDA provides a number of grant, loan and loan guarantee programs to the state. Within the proposed study region, they work through the Eastern Maine Development Corporation and the Mid-Coast Development Corporation. EDA also has a grants program through the Department of Marine Resources to ameliorate the impacts of Amendment 5 on Maine's groundfishing industry.

Small Business Administration -- The SBA provides loan guarantees, low interest loans and technical assistance to small businesses.

State

Department of Economic and Community Development -- DECD provides and administers the Community Development Block Grant program, promotes tourism, and assists in business development. DECD staff can provide assistance on state programs, identifying trade opportunities, and dealing with the various components of Maine state government.

Department of Marine Resources -- DMR has a Bureau of Marine Development that includes a Division of Industry Services. Their function is to promote commercial marine resources on a state-wide, national and international level. They also research basic impediments to marine resource development.

Finance Authority of Maine -- FAME offers a wide array of financial assistance programs to businesses within the state. They offer financing for seafood processors, loan guarantees

for fixed assets and working capital needs, direct loans for occupational safety improvements, and grants for research and applied technology.

Private

Island Aquaculture Company -- Formed in 1993, the Island Aquaculture Company is managed by a Swan's Island resident and employs 20% of the island's families. The Island Institute facilitated the creation of this new company to acquire the assets of an owner undergoing foreclosure. The IAC operates a scaled down version of the original fish farm with the intent of establishing a formula to slowly rebuild. The IAC has been an important diversification of the island economy which is heavily dependent on lobstering. The farm raises salmon and trout in 10 cages holding 100,000 fish. More recently, the IAC, along with several affiliates, has been working towards establishment of a marine hatchery at Swan's Island to promote year-round community employment.

Maine Aquaculture Innovation Center -- The MAIC explores innovative ways for aquaculture to expand in Maine.

Regional/Local

Eastern Maine Development Corporation -- EMDC works in 6 counties in eastern Maine, including most of the communities that are included in this proposal. EMDC is funded through the EDA, SBA, FmHA, local and regional funding sources and individual private contracts. EMDC in turn provides grants, loan programs and technical assistance within its service area. EMDC provides assistance on Community Development Block Grants and Job Opportunity Zones.

Resource Conservation and Development Offices -- There are two RC&D offices in the Penobscot Bay region: Time and Tide RC&D, serving Knox, Lincoln, Waldo Counties; and DownEast RC&D serving Hancock County. RC&D offices initiate, sponsor, plan and implement various natural resource projects on a local level. Technical assistance to RC&D offices is provided by the Natural Resource Conservation Service.

Local economic development organizations include: Action Committee of 50/Bangor-Brewer, Mid-Coast Development Corporation/Rockland, Greater Bangor Chamber of Commerce, Belfast Area Chamber of Commerce, Ellsworth Area Chamber of Commerce, Rockland Area Chamber of Commerce, and Rockport-Camden-Lincolnville Chamber of Commerce.

Municipalities -- Towns play a vital role in determining the climate for resource-based economic development within their boundaries. Some of the mechanisms towns within Maine have available include special waterfront zoning standards that allow commercial marine uses preferential treatment in waterfront zones, townwide zoning that identifies

growth areas and rural areas, enforcement of environmental requirements and, to some extent, conflict resolution.

3. Gaps

A. Data Management

One of the foremost gaps within Penobscot Bay's regulatory framework is the lack of data management. Information from various permitting programs is available but not mapped or collated. It is difficult to discern trends without this information. Gathering and interpreting this data would give the region informatin on the cumulative impact of development and small scale local decisions.

In some cases, information is available within the GIS framework. However, it may not be in a form that is usable at the local level and needs to be interpreted, collated and disseminated in usable form. This has the potential to be a strong outreach tool for towns.

B. Ecosystem Management

Maine needs to move to more holistic management of its natural resources. Currently, Maine regulates specific but interrelated components of natural systems through separate agencies with very different goals. Our natural resources are regulated but not actively managed. We are at a point where the pressures on our marine and near-shore ecosystems are so intense that they are threatened with deterioration. Conflicts between users are ever-present. Maine does not have the resources to address major management issues in our fisheries, or tracking systems to evaluate the policies that are in effect. Budgetary problems have forced state agencies, including the Maine Department of Marine Resources, to streamline research staff. Much of current marine research is funded through surcharges on specific harvesting licenses, limiting the breadth and scope of work that can be done. Little money is allocated to monitoring marine conditions; an important element of understanding threats to the system.

A Penobscot Bay Estuary Program will move Maine toward ecosystem management systems because it offers an opportunity to approach problems on an ecosystem basis, integrating the needs of people into the overall program.

C. Inadequate coordination among agencies

While state agencies have begun looking at Maine resources from a watershed perspective, there is little overall coordination. This project offers an opportunity to develop important linkages and relationships focusing on the geographic boundaries of Penobscot Bay.

D. Lack of cumulative impact review

Maine does not have the regulatory tools or data to assess cumulative impact. Comprehensive review of natural resource trends is almost non-existent in Maine. For example, although Maine law strictly regulates habitat modification in all coastal wetlands, there has been no attempt to assess the habitat modification information gathered through the regulatory process. Follow-up monitoring efforts are inadequate for compliance assessment and make no effort to measure habitat loss (DEP, 1994).

The Department of Environmental Protection regulates large scale land-use developments and development within particularly sensitive habitats such as coastal wetlands and sand dunes. Their review is restricted to site-specific standards that do not allow a broader view or consideration of threshold impacts. For example, the first structure within a sensitive environment may not have an unreasonable impact on the ecological integrity of that site, however the third, fourth or eighth structure will. There is no way to address this under the current regulatory scheme.

Many land-uses that could potentially affect the marine environment do not trigger an environmental review. Small land use development and non-point sources, whose cumulative effects can drastically alter the marine environment, are examples of these impacts. Effects on marine resources are not often included in land use reviews because decision-makers don't have the tools, expertise or regulatory authority to consider those effects. This project provides an opportunity to focus on species and habitats of importance and assess the impacts and threats to their habitats.

E. No Natural Resource Focus for Economic Development Programs

While Maine has the structure and programs in place for economic development initiatives, they generally do not have a natural resource focus. This issue brings in topics and partners outside the normal focus of the NEP program, however, the goal of sustainable economic development based on a healthy, viable ecosystem is consistent with those of the Coastal Zone Management Act. Specifically, the Penobscot Bay region needs to focus on low-impact tourism, aquaculture and seafood processing. Water quality improvement targeted to shellfish harvesting areas has spin-offs for economic development, also.

F. Regulatory Inefficiencies

Marine waters in Maine are broken into three categories according to their quality (SA, SB, SC). Allowable standards for discharges are based on the different categories with certain discharges and activities prohibited in the cleaner categories. Class SA waters are considered outstanding natural resources to be preserved because of their ecological, social, scenic, economic or recreational importance. Direct discharges to SA waters are prohibited. Acadia National Park and several coastal state parks have adjacent waters classified SA. Parts of Cobscook Bay are classified SA for ecological reasons, as well as the coast from Cutler to Lubec and areas around the Isle of Shoals.

While no discharges are allowed in SA waters, other activities that may affect their ecological integrity are unregulated. For example, draggers can comb the bottom and destroy the environmentally sensitive habitat this classification is designed to preserve. A marina can be sited within sensitive SA waters, with the potential for petroleum spills from fueling and sewage from boats. On the other hand, net pen aquaculture, so dependent on clean water and high flushing rates, cannot be sited in SA areas because fish feed and medicines are considered a discharge.

This regulatory system developed in the 1970s, is perpetuated as our basis for managing water quality. Yet it is a single-purpose approach that regulates one activity without a comprehensive approach for managing other threats to, or opportunities for, these same resources.

4. Coordination Mechanisms

The **Penobscot Bay Network** is a collaboration of organizations interested in promoting the long-term health of the Penobscot Bay region watershed. Members of the network include the University of Maine Cooperative Extension, Maine Coastal Program, Penobscot Bay Land Trust Alliance, Maine Department of Marine Resources, the Penobscot Riverkeepers 2000, the Penobscot Marine Museum, the Penobscot River and Bay Institute, Natural Resources and Conservation Service, Island Institute, Maine Aquaculture Innovation Center, Eastern Maine Development Corporation, and the University of Maine Sea Grant College Program.

The group was formed over three years ago to improve communication and cooperation among organizations interested in the Bay region, provide support for everyone working to preserve its integrity and assist efforts that promote sustainable development and a high quality of life for people in the region. The network sponsored two conferences focused on Penobscot Bay, one each in 1993 and 1994. Since then, the group has initiated several projects that have been taken over by member organizations.

Gulf of Maine Council on the Marine Environment is a joint state-provincial body whose charge is to promote the protection and conservation of the Gulf of Maine ecosystem. This effort has brought together federal, state, and provincial officials involved in regulation, planning and management of marine and coastal resources in the Gulf region on both sides of the international boundary.

Land and Water Resources Council -- See discussion under state roles.

DEP Watershed Division -- See discussion below.

5. Extent of Watershed Management

DEP's Division of Watershed Management

The Department of Environmental Protection's Land and Water Bureau has as its goal the management of watersheds in a more comprehensive manner. DEP wants to focus on whole

ecosystems rather than on single media or single agency approaches to better leverage Maine's private and public resources. DEP has developed a Division of Watershed Management (DWM) to "protect and improve the values of Maine's water and wetland resources by promoting environmentally sound land use throughout the watershed of these resources." These values include water quality, water quantity, aquatic habitat, wildlife habitat, scenic quality, and floodwater storage and conveyance.

To help coordinate watershed management activities in Maine, the DWM has developed a network of local, regional, state and federal agencies as well as private organizations that are active in this arena. A meeting of these players was held in July 1994 and will be held biannually in the future. A watershed pollution prevention initiative is currently being developed for the Androscoggin River Basin. DEP is acting as a catalyst to bring local municipalities and industries together to identify goals and objectives for the river by establishing teams with the towns abutting the river.

6. State Revolving Fund

The State Revolving Fund (SRF) program began in 1989. Since then, four bond issues have been passed by Maine voters for a total of $12.7 million matched by $60.6 million in Federal share to be spent on low-interest loans for waste water treatment improvement projects. The State maintains a multi-year SRF Project list and an Additional Needs list; several sites in the estuary are on these lists. The progress of any municipal treatment or collection system project from planning stage to final construction is determined by a variety of factors including public opinion, availability of funds and changes in the priority rank of the project, relative to other projects (DEP, 1994). In 1994, Bangor received an SRF loan to upgrade its wastewater treatment facility; the project was completed and on-line in 1994. Rockport and Stonington received grants for projects completed and on-line in 1994, to eliminate untreated and unlicensed discharges.

7. 319 Assessment Report

The 319 Assessment Report noted that there was insufficient data to accurately assess the threat of NPS to Maine's coastal waters. It noted the need to establish trends monitoring in the State's major embayments and harbors, including Penobscot Bay. Current 319 projects include the development of a Nonpoint Source Pollution Survey Manual for Coastal Waters and a BMP Manual for Marine-Related Industries.

8. Past Efforts to Identify and Correct Estuary Problems

Past efforts to identify and correct estuary problems include a land use plan and an oil spill preparedness document, both funded by CZMA, as well as the Penobscot Bay Conservation Plan funded jointly by CZMA and the Endangered and Nongame Wildlife Fund of the Maine Department of Inland Fisheries and Wildlife. The 208 basin plan, developed for the Penobscot River in 1980, incorporated all of the watershed of the river, except for the area draining directly to

the Bay. The plan describes the basin, water quality standards, limited segments, point sources, municipal facilities, nonpoint sources, regulatory programs, public participation and intergovernmental cooperation (DEP, 1980).

9. Status of Programs

The State's Surface Water Monitoring Program, administered by DEP and initiated in 1994, lists the following as having high priority for sampling: commercially harvested shellfish areas; swimming areas; harbors and other confined waters adjacent to population centers; and select pristine waters which are considered to be representative of similarly situated waters (DEP, 1994).

Maine has an aggressive program, coordinated with EPA's CSO program, to assist communities in evaluating the design, condition, activity and effects of combined sewer systems and overflows. In 1990, the first CSO-related bond issue was passed, establishing a fund of $2.4 million for four specific communities' projects. A second bond issue of $2.4 million was passed in 1990 to establish a fund to provide CSO planning grants at 25% of eligible costs. In fiscal year 1993/1994, Bucksport and Castine received a total of $6,019.00 in CSO planning grants.

In 1981, the Maine Legislature enacted a law designed to allow the State to help finance small waste water treatment projects. The law authorizes up to $1 million each year for the construction of waste treatment systems and authorizes the DEP to pay up to 90% of the costs of such systems. Grants are limited to $100,000 per year for each town. This program fills a need which is largely unmet by the Federal Revolving Fund program. It allows DEP to clean up scattered small-scale problems by funding installation of individual or cluster systems in a very cost-effective manner.

In 1987, the Maine Legislature prohibited overboard discharges (OBDs) from lots with unsuitable soils for inground disposal. In 1989, the Legislature amended the law by establishing an OBD Removal Fund to assist homeowners with the installation of alternative systems, where feasible. With the goal of reclaiming closed shellfish areas, this law has great significance for the future management of Maine's coastal waters. Since its start in 1989, the OBD Removal Fund has been funded by successful bond issues in 1989, 1990, 1992, and 1993, for a total of $3.5 million. For any discharge targeted for removal, DEP grants will pay up to 90% of eligible costs for year-round residential replacements, 50% for commercial replacement systems and 25% for seasonal residential replacement systems. From July, 1993 to June, 1994 8 Penobscot Bay towns received a total of $313,825 for removal of overboard discharges, more than one third of the funds granted for discharge removal in the entire state.

10. Efforts to Improve or Maintain Water Quality in the Estuary

DEP and EPA are undertaking an initiative to move to a watershed approach for NPDES permitting. This will be accomplished by dividing the State into five watersheds, and, following a five year cycle, issuing all the permits within each watershed as a whole. This will enable DEP to focus its ambient water quality information collection and field work, and enhance its ability to

manage each watershed as a whole. The Penobscot River watershed is scheduled to be addressed in 1997 (Bureau of Land and Water Quality Annual Report, 1994).

The Shore Stewards program, established with Coastal Zone Management Act funds, initiates and supports community-based volunteer water quality monitoring efforts in Penobscot Bay and other areas of the coast. (See discussion of water quality monitoring under Section V(2).) The CZMA also supports comprehensive municipal planning in the region with a goal, in part, of protecting environmental quality in the estuary. The Maine Coastal Program, with funding through the USFWS, provides 75% grants to marinas to construct boat pump-out facilities.

VI. Management Conference Participants

1. An Existing Group is Capable of Serving as the Core Group

The Penobscot Bay Network was formed over three years ago to improve communication and cooperation among organizations interested in the Bay region, provide support for everyone working to preserve its integrity, and assist efforts that promote sustainable development and a high quality of life for people in the region.

Members of the network include the University of Maine Cooperative Extension, Maine Coastal Program, Penobscot Bay Land Trust Alliance, Maine Department of Marine Resources, the Penobscot Marine Museum, the Penobscot Riverkeepers 2000, the Penobscot River and Bay Institute, the Natural Resources and Conservation Service, the Island Institute, the Maine Aquaculture Innovation Center, Eastern Maine Development Corporation, and the University of Maine Sea Grant College Program.

Members of the network would like to use the NEP process to broaden the existing membership and accomplish the stated goals.

2. Conference Membership Consists of all Parties Required by the Act

The following entities are proposed to be part of the Penobscot Bay Management Conference. Those entities that are currently part of this process are highlighted with an asterisk while those that have expressed interest are noted with an "@".

Federal Government
- Natural Resource Conservation Service*
- Fish and Wildlife Service@
- Acadia National Park

Penobscot Indian Nation@

State Government
- Department of Marine Resources*
- Department of Environmental Protection*
- Department of Economic and Community Development*
- State Planning Office*
- Department of Inland Fisheries and Wildlife

Local Governments
- Penobscot Valley Council of Government*
- Midcoast Regional Planning Commission*

Hancock County Planning Commission@
Municipalities that have expressed interest in the proposal
- Castine@
- Penobscot@
- Bangor@
- Brewer@
- Hampden@
- Lincolnville@
- Islesboro@
- Rockland@
- Rockport@
- Owl's Head@
- Matinicus Isle Plantation@

Non Governmental Organizations
- Eastern Maine Development Corporation*
- Island Institute*
- Penobscot Bay Land Trust Alliance*
- Penobscot Marine Museum*
- Collaboration of Community Foundations
- Maine Development Foundation

Educational
- University of Maine Cooperative Extension*
- Penobscot Riverkeepers 2000*
- University of Maine Sea Grant Program*
- Maine Maritime Academy

Industry
- Maine Aquaculture Innovation Center*
- Maine Aquaculture Association
- Pen Bay Pilots Association
- Maine Lobstermen Association
- Maine Marine Trades Association
- Maine Gillnetters Association
- Maine Fishermen's Forum

3. Support Documents of Key State and Local Stakeholders

As noted above, key stakeholders at both the state and regional level are involved in this process through the Penobscot Bay Network. Additional letters representing a broader base of support are included in Appendix G.

4. Organizational and Membership Chart

Figure 5 presents the organizational chart as proposed by the Penobscot Bay Network. In developing the structure of this proposed organization we used the following guiding principles:

* Involvement of Bay stakeholders at the appropriate policy, technical, planning and operational levels;
* promoting the integration of ecological and political concerns; and
* creating estuary program management mechanisms that are:
    -- inclusive,
    -- able to make thoughtful and timely decisions,
    -- administratively simple with clear roles and responsibilities, and
    -- accountable.

Overall direction will come from the Penobscot Bay Management Committee. The Committee will be headed by a chair person whose term is for one year. The PBMC is composed of 10 to 15 Bay stakeholders. Staff support for the PBMC is through a secretariat that works through the Committee. The Secretariat will be composed of 3 to 5 PBMC representatives, plus staff members. The Secretariat also provides the three working groups with assistance. A scientific advisory group and citizen's advisory group will provide formal input to the NEP, reporting through the Management Committee.

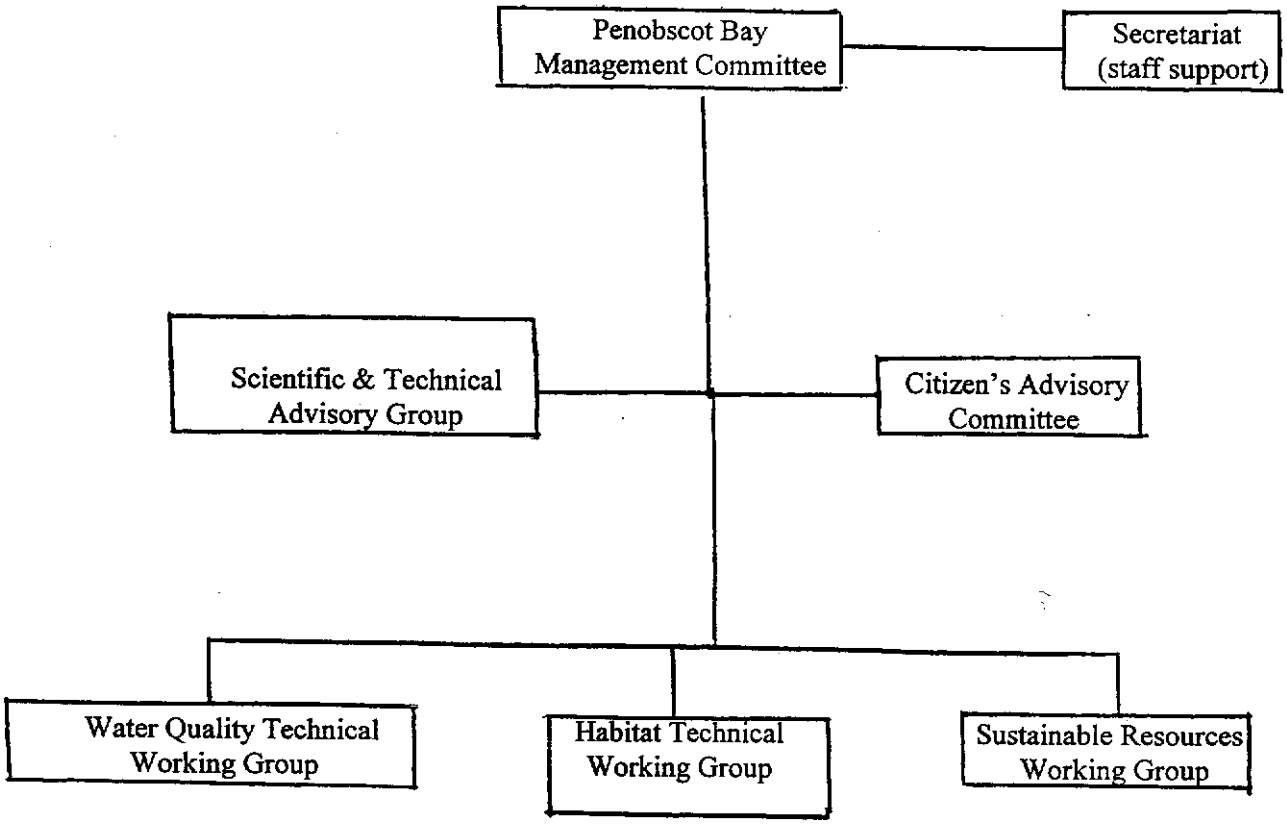
Three technical working groups will be formed to address the overall goals of the NEP: Water Quality (improving land and water management), Habitat (protecting and restoring terrestrial and marine habitats), and Sustainable Resources (expanding Bay economic opportunities). Each will be composed of about 25 people. In forming the PBMC it will be necessary to organize 1 to 3 ad-hoc Bay Roundtables to learn about the concerns and ideas of selected stakeholders. Examples include Bay businesses (marine and watershed-based), tribal and municipal government, education and research community, NGO community and interests, and Bay citizens. The Roundtables may result in the formation of additional committees as needed (e.g. Bay Business Consortium, Municipal Affairs, etc.).

5. Reflects Priority Problems

The Penobscot Bay Management Committee has been devised to reflect the priority problems affecting Penobscot Bay. The overall Committee draws on a wide spectrum of interests within the region for input and support. Three technical work groups directly address the major goals of this proposal. It is envisioned that these work groups will be composed of members of the Management Committee as well as people recruited to address and resolve specific issues. The initial public participation efforts will help generate a list of interests and persons to fill specific niches within this framework.

Figure 5.

Proposed Organizational Chart of the Management Conference



VII. Management and Oversight

1. Demonstrates that the Management Conference can Develop a CCMP

Figure 6 presents the proposed timetable for the Penobscot Bay NEP. Current efforts to complete the State of the Bay report and broaden the Penobscot Bay Network will continue. After designation, the Penobscot Bay Management Committee will be convened and the goals and tasks set forth in the draft Conference Agreement will be refined. Planning will begin shortly after the goals and tasks are refined. Base analysis, characterization and synthesis will begin early in the first year. In addition to needs outlined in the draft conference agreement, the State of the Bay report will help articulate the data and characterization that is needed.

The Draft CCMP will be initiated within six months of the Management Committee being convened and will be completed within one year. Public input will be solicited before the draft is completed through the public advisory group and additional public meetings. The final CCMP will be initiated within 18 months of designation and will be completed at the end of year three. Extensive public input on the proposal will be gathered toward the end of that period. After the 3-year grant period, the Penobscot Bay Network will continue to work toward the goals of the Management Conference.

Because the Penobscot Bay Network has been working toward goals similar to the National Estuary Project, much of the initial work of developing coalitions and identifying issues and solutions has already been done. The draft management agreement contains a proposed work plan that outlines the tasks identified on a preliminary basis, with a timetable for completion. (See Penobscot Bay Work Plan and Budget, attachment #2 of the Draft Penobscot Bay Conference Agreement.)

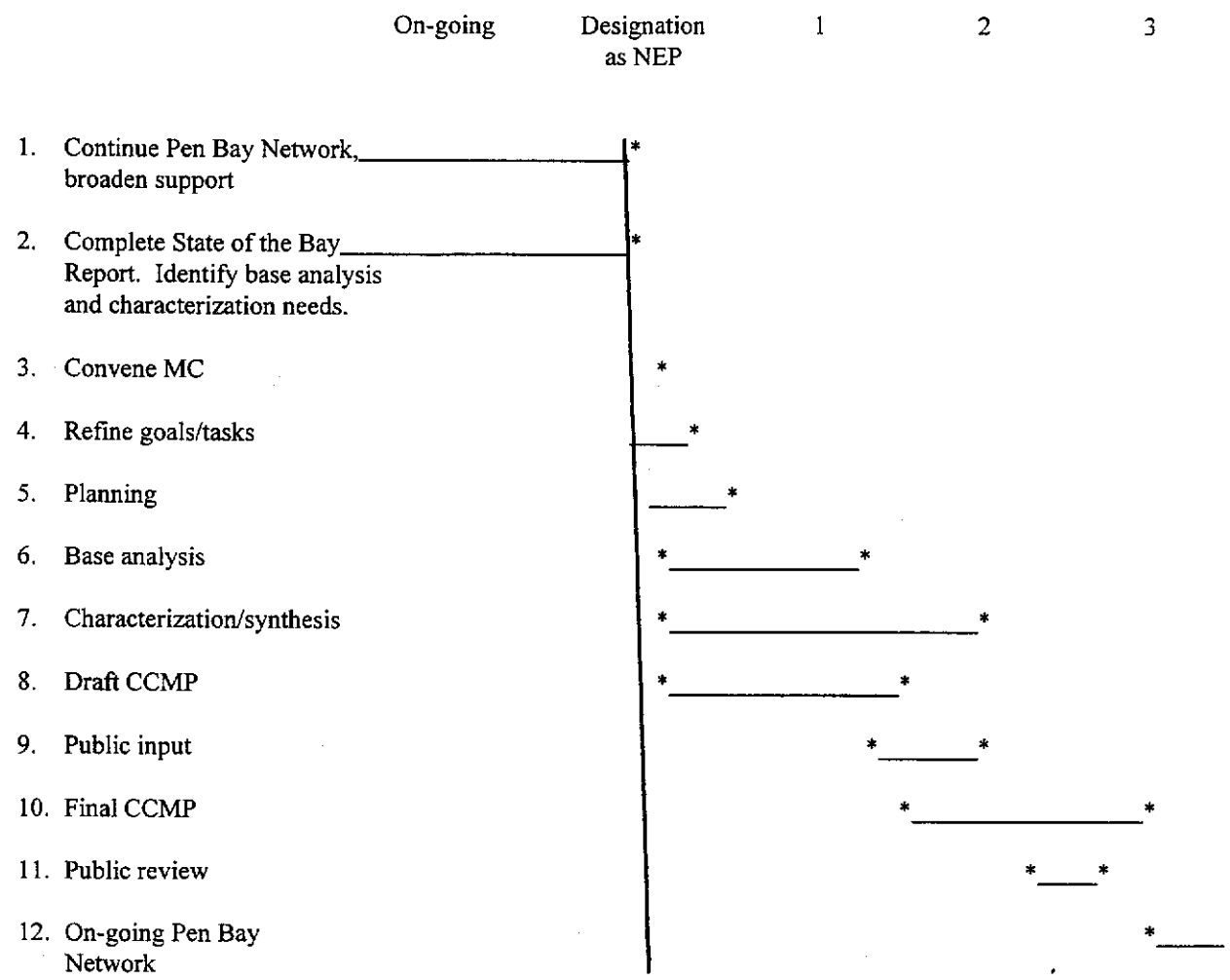
2. Management Entity to Receive and Administer Grant

The Department of Marine Resources (DMR) will receive and administer the NEP grant. Robin Alden, Commissioner of Marine Resources, and former editor of *Commercial Fisheries News,* will be responsible for overall staff management and direction. Additional staff dedicated to the goals of the program are included in the 25% match in the draft conference agreement. Initial administrative support will be provided through the DMR.

The DMR is a logical choice for administering this grant. The agency is organized in Bureaus that track the overall goals of this proposal. The Marine Development Bureau addresses fisheries-related economic development issues through their industry services and education divisions, and through water quality testing. The Marine Research Bureau is responsible for meeting the research needs of the Department.

Figure 6.

Proposed Timetable for Penobscot Bay NEP



The Penobscot Bay Network strongly recommends that the NEP grant come through the DMR, who in turn will make a grant to a newly-formed non-profit organization (501(c)3). This organization will be initiated when the Penobscot Bay NEP designation is announced. By forming a new organization, the Penobscot Bay Network intends that the Management Committee will truly represent a collaboration of stakeholders rather than the agenda of one organization.

3. State or Local Entity Commits to Provide Accommodation and Support

The Penobscot Bay Network will provide or arrange for the facilities and needed support for the staff of the Penobscot Bay Estuary Project. These facilities will be within the proposed study region.

4. Managing Authority to Evaluate and Make Adjustments

The proposed management authority consists of the Penobscot Bay Management Committee (PBMC), a broad-based group of organizations that will grow out of the current Penobscot Bay Network. The proposed PBMC as outlined in section VI(2) will consist of federal, state and local government representatives, tribal representatives, non-governmental organizations, educational organizations, and industry representatives.

The PBMC will have an executive director and staff to manage the day-to-day operations of the NEP. While normal operations will be under the purview of the executive director, the executive director will bring policy issues to the PBMC. The PBMC will have a chairperson and vice-chairperson, nominated for one-year terms, as well as a five member executive committee. Major policy issues will be brought to the full PBMC unless time constraints require direction from the executive committee.

The technical working group for each issue will evaluate action plans. Any recommendations will be brought to the full PBMC, with recommendations for how an adjustment should be made. The full PBMC will discuss and vote on any needed changes to the action plans.

VIII. Political Will and Commitment

1. Political Commitment

A. State Support

It has been easy for Governor King to assure EPA of Maine's financial and political commitment to a Penobscot Bay National Estuary Project for two reasons. First, the King administration is especially committed to economic development in sectors where Maine holds a comparative advantage. We believe marine resources to be such a sector and that NEP designation will enable Maine to maintain its advantage through focused water quality and resource development efforts in Penobscot Bay. Second, this grant request represents continuing collaboration on the part of five state agencies, an approach to economic and resource issues which the State wishes to continue and strengthen.

B. Municipal Participation

The municipalities and three regional planning commissions of the Penobscot Bay region have been active participants in the 1993 and 1994 Penobscot Bay Conferences and other activities of the Penobscot Bay Network. The enclosed letters of support (see Appendix G) represent the full range of Penobscot Bay communities (East Bay, West Bay, Penobscot River, the Islands) and their specific interests from among the estuary project goals. Generally, municipalities will support implementation of the CCMP goals for water quality, habitat protection and sustainable economic development through state-funded growth management/comprehensive planning programs and the establishment or revival of local shellfish committees. More particularly, communities will work toward implementation goals through participation programs aimed at eliminating overboard discharges, boat waste discharges, marine debris reduction and establishment of water quality monitoring programs.

C. State and Local Legislative Support for Estuary Protection

Maine has a long tradition of support for estuarine values. Since the clean-up of Maine's rivers in the 1970's Maine has continued support through legislative actions to protect its estuaries. The Natural Resources Protection Act (NRPA) protects coastal wetlands from alteration and discharges. Shoreland zoning requires setbacks from shore, primarily for water quality purposes. The Growth Management laws have provided the impetus for many towns to update their comprehensive plans, incorporating environmental concerns. The Overboard Discharge Removal Grant Program and the success for bond issues supporting its financing are a further indication of support.

D. Implementation Funding Sources

Over the course of three years, the State Planning Office and the Departments of Marine Resources, Economic and Community Development, and Environmental Protection have devoted considerable staff time and financial resources to the Penobscot Bay Network activities which have culminated in this proposal. Federal government staff and resources have been contributed by University of Maine Sea Grant and Cooperative Extension as well as the Natural Resource Conservation Service. This federal and state commitment of time and resources will be devoted to estuary project implementation through the on-going activities of the Penobscot Bay Network. Continuing state resources pledged to implementation include Growth Management Program grants and technical assistance, Overboard Discharge Removal Grants, Small Communities Grants, and Partners in Monitoring Grants.

XI. Public Support

1. Past Efforts at Public Involvement

The Penobscot Bay Network has generated substantial public interest and involvement focused on the issues of Penobscot Bay through their 1993 and 1994 conferences (see Appendix C, D, E). Each of these conferences hosted between 100 and 200 people. These conferences were focused on defining and discussing issues facing the Bay and provided a forum for developing the ideas that form the basis of this proposal.

2. Plan for Future Public Involvement

A public participation plan is one of the first tasks undertaken under the fourth goal of the draft conference agreement. In addition, future plans for maintaining public participation include holding an annual conference highlighting the efforts and findings of the NEP. The first conference will focus on the State of the Bay report, to be published in September of 1995.

Finally, the overall structure of the Penobscot Bay Management Conference incorporates public participation through a citizens advisory group that provides input to the PBMC.

3. Evidence that People Agree with Priority Problems and Support Actions

The Penobscot Bay conferences held in 1993 and 1994 defined the issues identified in this proposal. The proceedings are attached. They highlight the issues and discuss some of the shortcomings in existing mechanisms for addressing those issues.

Several other documented sources augment this problem definition. The Knox County Economic Development Strategy and Action Plan (1993) includes as a guiding principle "Preserving the aesthetic, physical, and cultural treasures of Knox County is everyone's desire. Nearly all businesses rate quality of life as the top attraction for this area." In defining a vision for Knox County, the plan included as an issue for continuing development, an environmental business showcase to emphasize the sound promotion and development of business in harmony with the environment, together with a need for vertical integration of natural resource industries allowing for the harvesting and value-added production of these resources.

The Maine Environmental Priority Project surveyed Maine residents as to their environmental concerns. Water quality consistently ranked as one of the top environmental issues of concern (Critical Insights, 1994).

Passage of every one of a long series of bond issues for various State water quality programs, such as the Overboard Discharge Removal Fund and the Small Community Grants Program, is testament to the great importance Maine people place on improved water quality.

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Appendix A

Conservation Land in Penobscot Bay Study Area

HANCOCK COUNTY	owner	acreage
Blue Hill		
Third Island (59-742)	MBPL	0.5
(no name) Island (59-740)	MBPL	1
Twin Oaks Island (59-619)	MBPL	0.5
(no name) Island (59-611)	MBPL	1
Brooklin		
Ivy Island (59-743)	MBPL	0.5
Green Island (59-344)	MBPL	1.8
Gangway Ledge (59-756)	MBPL	1
Sellers Island (59-930)	MBPL	2
Smuttynose Island (59-931)	MIF&W	5
Chatto Island (59-754)	ANP (E)	10
Upper Torrey Island (59-758)	ANP (E)	25
Lower Torrey Island (59-757)	ANP (E)	?
Babson Island (59-921)	ANP (E)	16
Little Babson Island (59-920)	ANP (E)	12
Hog Island (59-929)	ANP (E)	90
Brooksville		
Thrumcap Island (59-669)	MIF&W	1
Buck Island (59-672)	MIF&W	0.5
Holbrook Island Sanctuary	MBPR	1,225.25
Bucksport		
Castine		
Battery Gosselin Historic Site	MBPR	0.25
Fort George Historic Site	MBPR	2.75
Henderson Natural Area	Castine Conservation Trust	90
Hatch Natural Area	MCHT	96.5
Holbrook Island Sanctuary (59-650)	MBPR	120
Deer Isle		
Green Ledge (59-674)	MBPL	1
Two Bush Island (59-681)	MBPL	1
East Barred Island (63-683)	MBPL	1.5
West Barred Island (59-684)	MBPL	4.5
Colt Head Island (59-685)	MBPL	5
Crow Island (59-810)	MBPL	10
Hardhead Island (59-782)	MBPL	5
Sloop Island (59-795)	MBPL	3
Grass Ledge (59-802)	MBPL	2
Scraggy Island Ledges (59-837,838)	MBPL	1,1
Freese Islands (59-936,939)	MBPL	1,1
(no name) Island (59-906)	MBPL	1
Potato Island (59-944)	MBPL	2
Green Ledge (59-949)	MBPL	1
Pickering Cove	MBPR	94

Little Eaton Island (59-713)	MIF&W	2
Grass Ledge (59-802)	MIF&W	1
Sloop Island Ledge (59-796)	MIF&W	1
Shabby Island (59-996)	MIF&W	2.6
Bald Island (59-803)	ANP (E)	13
Eagle Island Light (59-793)	USCG	2
Butter Island (59-776)	ANP (E)	300
The Sugarloaf (59-775)	ANP (E)	?
Peak Island (59-774)	ANP (E)	?
Scrag Island (59-778)	ANP (E)	?
Pond Islands (59-676,677,678)	ANP (E)	33
Heart Island (59-811)	ANP (E)	?
Sheep Islands (59-943,xxx)	ANP (E)	29
Mountainville	ANP (E)	?
Big Hay Island (59-937)	ANP (E)	?
Sheep Island (59-709)	TNC	5
Bradbury Island (59-771)	TNC	175
Barred Island (59-825)	TNC	2
Campbell Island (59-923)	The Island Institute	90

Orland

Toddy Pond Boat Launch Site	MBPR	?
Craig Brook Fish Hatchery	USF&W	137.35

Penobscot

Sedgewick

Stonington

George Head Ledge (59-896)	MBPL	1
Steve Island (59-897)	MBPL	2
Moose Island Ledge (59-830)	MBPL	1
Little Sheep Island (59-954)	MBPL	1.6
Shingle Island Ledge (59-914)	MBPL	1
(no name) Island (59-987)	MBPL	1
Hell's Half Acre (59-961)	MBPL	2
Ram Island (59-966)	MBPL	4
No Man's Island (59-977)	MBPL	5
Phoebe Ledge (59-973)	MIF&W	2
Saddleback Island (59-972)	ANP (E)	?
Spruce Island Ledge (59-995)	ANP (E)	1
Buckle Island (59-970)	ANP (E)	?
Spruce Island (59-974)	ANP (E)	80
Gooseberry Island (59-969)	ANP (E)	?
Crockett Cove Woods	TNC	100
Russ Island (59-867)	The Island Institute	40
Wreck Island (59-898)	TNC	80
Round Island (59-899)	TNC	46

Swans Island

Halibut Rocks (59-979,991)	MBPL	2.3,2
Saddleback Island (59-999)	MBPL	2
Black Ledge (59-482)	MBPL	2
Mason Ledge (59-481)	MBPL	6

Brimstone Island (59-479)	MBPL	1.5
(no name) Island (59-477)	MBPL	1
(no name) Island (59-401)	MBPL	1
Ram Island (59-410)	MBPL	3.1
Hen Island (59-387)	MBPL	2
Heron Island (59-480)	ANP	50
Hockamock Head Light	USCG	2
Sand Cove, Swans Island (59-413)	ANP (E)	?
Hat Island (59-412)	ANP (E)	24
West Point, Swans Island (59-413)	ANP (E)	?
Swans Island Head (59-413)	ANP (E)	?
Duck Island (59-385)	ANP (E)	?
Buckle Island (59-375)	ANP (E)	28
Buckle Island Harbor	ANP (E)	?
(no name) Island (59-376)	ANP (E)	?
Johns Island (59-351)	ANP (E)	?
Opechee Island (59-350)	ANP (E)	?
Black Island (59-352)	ANP (E)	?
Orono Island (59-354)	ANP (E)	25
Round Island (59-360)	ANP (E)	?
West Sister Island (59-411)	ANP (E)	?
Verona		
Penobscot River Boat Launch Site	MBPR	?

KNOX COUNTY

Camden		
Camden Hills State Park	MBPR	5,532.33
Camp Rabbit	MBPR (E)	25
Megunticook Lake	MDOT	8.92
Petit Manan NWR-Camden	USF&W	5
Richard Hodson Memorial Property	Coastal Mtns. LT	35
Fernalds Neck	TNC	318
Isle au Haut		
West Halibut Ledge (63-206)	MBPL	1
Ram Island (63-211)	MBPL	4
Harbor Island (63-203)	MBPL	11
South Mark Island (63-260)	MBPL	9
Wheat Island (63-268)	MBPL	3.8
North Popplestone Ledge (63-261)	MBPL	2
South Popplestone Ledge (63-265)	MBPL	4
White Ledges (63-267,298)	MBPL	3,2
Doliver Island (63-276)	MBPL	2
Rabbit's Ear (63-278)	MBPL	2
The Cowpen (63-284)	MBPL	1
Black Horse (63-294)	MBPL	2.5
White Horse (63-293)	MBPL	1.5
Sparrow Island (63-200)	MIF&W	3
The Cow Pen (63-287)	MIF&W	3
Great Spoon Island (63-287)	MIF&W	47
Spirit Ledge (63-998)	MIF&W	1
Pell Island (63-215)	ANP (E)	30

Mouse Island (63-262)	ANP (E)	?
Burnt Island (63-271)	ANP (E)	100
Isle au Haut (63-230)	ANP (E)	?
Isle au Haut (63-230)	ANP	?
Isle au Haut Light (63-230)	USCG	0.11
Western Ear (63-244)	ANP	20
Eastern Head, Isle au Haut (63-230)	ANP	142
Little Spoon Island (63-289)	ANP (E)	25
Matinicus Isle Plantation		
(no name) Island (63-909)	MBPL	2
Two Bush Island (63-902)	MBPL	1
Wheaton Island Ledge (63-906)	MBPL	1
West Black Ledge (63-911)	MBPL	1
East Black Ledge (63-913)	MBPL	1
Wheaton Island (63-914)	MBPL	2
(no name) Island (63-915)	MBPL	1
No Man's Land (63-900)	MIF&W	22
Ten Pound Island 63-920)	National Audubon Society	27
North Haven		
East Goose Rock (63-335)	MBPL	1
Dagger Ledge (63-014)	MBPL	1
Dagger Island (63-015)	MBPL	7
The Downfall (63-016)	MBPL	3
Burnt Island Ledge (63-027)	MBPL	1
Robinson's Rock (63-341)	MIF&W	2
Goose Island (63-336)	MIF&W	5
Spoon Island Ledge (63-011)	MIF&W	1
Crabtree Point	ANP (E)	?
Cross/Dumpling Islands (63-349,350,351)	ANP (E)	?
Ames Point	ANP (E)	?
Goose Rocks Light (63-xxx)	USCG	1
Babbidge Island (63-036)	ANP (E)	75
Sheep Island (63-018)	TNC	25
Mark Island (63-339)	TNC	36
Owls Head		
Birch Point Beach State Park	MBPR	56.25
Owls Head Recreation Area	MBPR	12.9
Owls Head Light	USCG	17
R. Waldo Tyler WMA (see South Thomaston)		
Rockland		
Rockland Breakwater Light	USCG	1.4
Rockport		
Goose Rocks (63-314)	MBPL	1
Clam Cove Scenic Area	MDOT	3.81
Harkness Grant	TNC	5
Simonton Corner Quarry	TNC	11
St. George		
East Egg Rock (63-860)	MBPL	9

Little Egg Rock (63-873)	MBPL	2
Shag Ledges (63-820,821)	MBPL	1,1
Gunning Rocks (63-578,836)	MBPL	3,1.4
Little Whitehead Island (63-552)	MBPL	5
Little Norton Island (63-553)	MBPL	7
Seal Island (63-637)	MBPL	1
Seavey Island (63-566)	MBPR (E)	38
Fort St. George State Historic Site	MBPR	2.6
Garden Island (63-420)	MIF&W	1
Shark Island (63-875)	MIF&W	2
Little Burnt Island (63-841)	MIF&W	8
Old Hump Ledge (63-838,839)	MIF&W	7
Marshall Point Light	USCG	1
Whitehead Island Light (63-554)	USCG	10
<u>South Thomaston</u>		
R. Waldo Tyler WMA	MIF&W	533
<u>Thomaston</u>		
Montpelier State Historic Site	MBPR	4.25
<u>Vinalhaven</u>		
Little Hen Island (63-078)	MBPL	1
(no name) Island (63-185)	MBPL	1.5
Hay Island (63-091)	MBPL	9
(no name) Island (63-072)	MBPL	1
(no name) Island (63-103)	MBPL	1
(no name) Island (63-479)	MBPL	1
Ram Island (63-481)	MBPL	4
Green Ledge (63-493)	MBPL	2
South Big Garden Island (63-508)	MBPL	4
(no name) Island (63-512)	MBPL	3
(no name) Island (63-515)	MBPL	2
Little Hurricane Ledges (63-516,517)	MBPL	1,1
Two Bush Island (63-522)	MBPL	1
Deadman's Ledge (63-170)	MBPL	2
South Hurricane Ledges (63-523,524,526)	MBPL	1,1,1.5
Channel Island (63-168)	MBPL	1
East Roberts Island (63-175)	MBPL	4
Diamond Rock (63-171)	MBPL	1
Narrows Island Ledge (63-138)	MBPL	1
Green Island (63-125)	MBPL	1
Little Green Island (63-158)	MIF&W	2
Carvers Island (63-166)	MBPR	15
Browns Head Light	USCG	7.3
Shipwreck Cove	ANP (E)	?
Greens Island (63-157)	ANP (E)	?
(no name) Island (63-154)	ANP (E)	?
Heron Neck (63-157)	ANP (E)	?
Heron Neck Light (63-157)	USCG	2
Saddleback Ledge Light (63-999)	USCG	1
Calderwood Point	ANP (E)	?
Saltonstall Reservation	Vinalhaven LT	75
Perry Creek Conservation Area	Vinalhaven LT	158

Neck (Hall) Island (63-476)	Vinalhaven LT	13
Basin Preserve	MCHT	214
Basin Preserve, 16 islands	MCHT	6
Big Garden Island (63-509)	TNC	26
Big White Island (63-513)	TNC (50% undivided)	26
Lanes Island (63-149)	TNC	43
Brimstone Islands (63-172,173,176,177, 178,179,180,181,182)	TNC	42
Smith Island (63-126)	TNC	8
<u>Criehaven Township</u>		
Pudding Island (63-924)	MBPL	3
Shag Ledge (63-925)	MBPL	2
Harbor Ledges (63-926)	MBPL	1
Camp Cove Island (63-928)	MBPL	2
Green Ledge (63-929)	MBPL	2
High Ledge (63-933)	MBPL	1
Brig Ledge (63-934)	MBPL	1
Matinicus Rock Light (63-940	USCG	8
Seal Island NWR (63-923)	USF&W	131.76
<u>Muscle Ridge Township</u>		
Hewitt Island (63-621)	MBPL	1
Yellow Ledge (63-629)	MBPL	1
Little Two Bush Island (63-652)	MBPL	1.5
Marblehead Island (63-403)	MBPL	1
Crescent Island (63-411)	MBPL	1
Fisherman Island (63-402)	MIF&W	12
Two Bush Island Light (63-653)	USCG	7.5

LINCOLN COUNTY

<u>Monhegan</u>		
Duck Rocks (65-310,311)	MBPL	1,1
Smuttynose Island (65-314)	MBPL	1
Inner Duck Rock (65-316)	MBPL	1
Eastern Duck Rocks (65-312,313)	MIF&W	1,1
Manana Island Radio Station (65-320)	USCG	1
Monhegan Island Light (65-317)	USCG	2

PENOBSCOT COUNTY

<u>Bangor</u>		
Browns Woods	City of Bangor	25
Prentiss Woods	City of Bangor	30
Essex Street Recreation Area	City of Bangor	61
City Forest, Bog Lots	City of Bangor	600
<u>Brewer</u>		
<u>Eddington</u>		
Penobscot Experimental Forest	USFS **(lease)**	1,670
<u>Hampden</u>		

Orrington		
Penobscot River Boat Launch Site	MBPR	?
Veazie		
Belfast		
Frankfort		
Mount Waldo	Town of Frankfort	124
Howard Mendall WMA	MIF&W	221
Islesboro		
Flat Island (77-047)	MIF&W	3.5
Thrumcap Island (77-053)	MBPR (E)	1
Warren Island State Park (77-050)	MBPR	70.4
Lincolnville		
Camden Hills State Park (see Camden)		
Fernald's Neck (see Camden)		
Ducktrap River	MBPR	8.95
Northport		
Northport	MBPL	105
St. Clair Preserve	TNC	304
Prospect		
Howard Mendall WMA (see Frankfort)		
Fort Knox State Historic Site	MBPR	124.5
Searsport		
Moose Point State Park	MBPR	146.64
Stockton Springs		
Fort Pownal State Historic Site	MBPR	154.5
Sandy Point Beach	MBPR	100
Fort Point Light	USCG	6
Sandy Point Flowage & Boat Launch	MIF&W	543
Winterport		

abbreviations used:

MBPL	Maine Bureau of Public Lands
MBPR	Maine Bureau of Parks and Recreation
MIF&W	Maine Department of Inland Fisheries and Wildlife
MDOT	Maine Department of Transportation
USCG	United State Coast Guard
USF&W	United States Fish and Wildlife Service
USFS	United States Forest Service
ANP	Acadia National Park
TNC	The Nature Conservancy
MCHT	Maine Coast Heritage Trust
NWR	National Wildlife Refuge
WMA	Wildlife Management Area
LT	Land Trust
(E)	Easement

Number in parentheses after island name is Coastal Island Registry Number.

Compiled by Richard D. Kelly Jr., Maine State Planning Office, March, 1993.

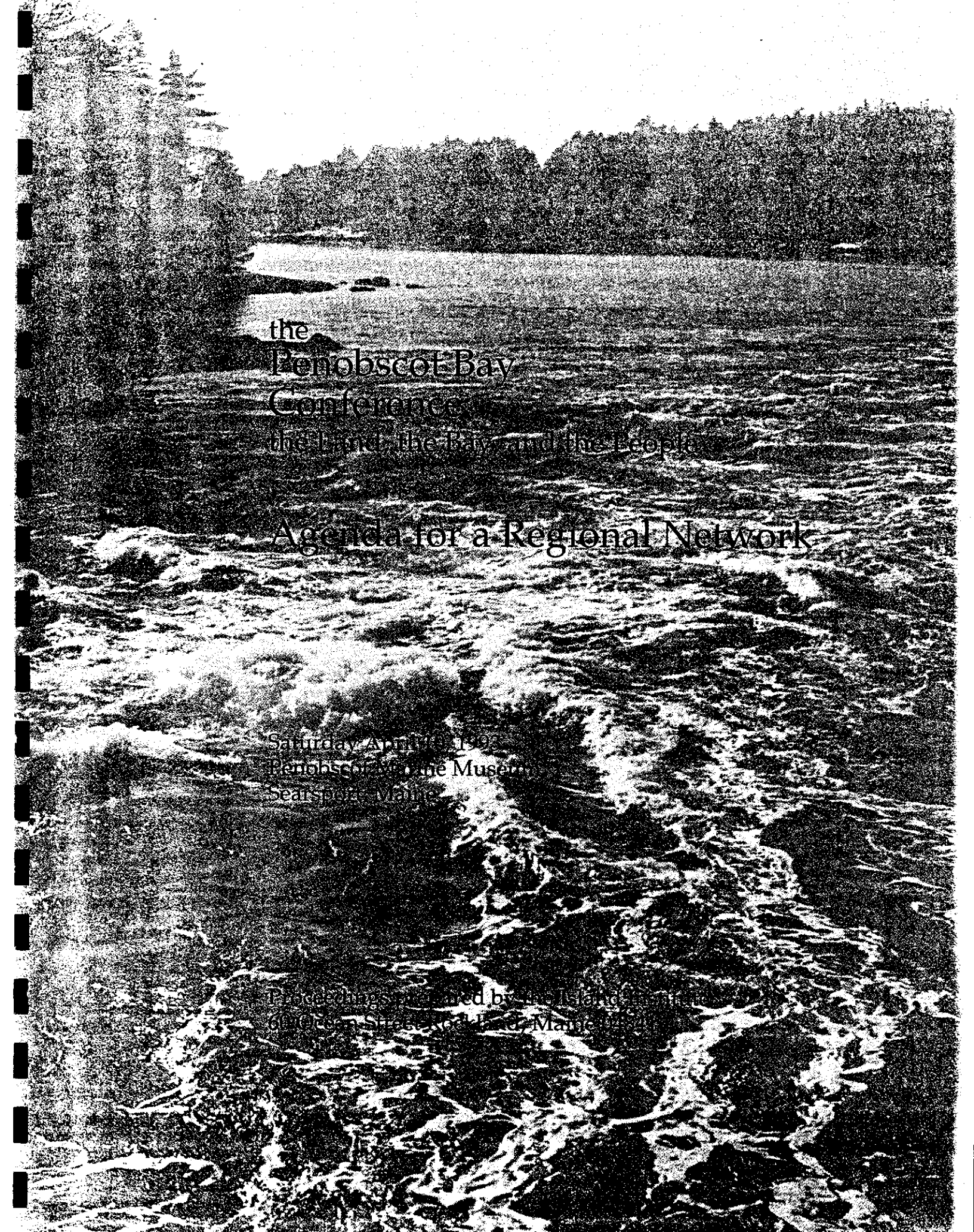
Appendix B

Conservation Acreages In Penobscot Bay Region

By Land Trust

Land Trust	Parcels Owned	Acreage Owned	Number Easements	Easement Acreage	Totals Acres Protected
Blue Hill Heritage Trust	4	128	17	1,113	1,241
Castine Conservation Trust	8	141	10 + 1	423	564
Coastal Mountains Land Trust	1	35	7	693	728
Georges River Land Trust			9	320	320
Island Heritage Trust			4	122	122
Island Institute	2	150			150
Islesboro Islands Trust	3	44	9	320.04	364.04
Maine Coast Heritage Trust	2	220			220
Mid-Coast Audubon Society	2	110			110
Monhegan Associates	8	270			270
Oyster River Bog Association	3	35		750	785
Vinalhaven Land Trust	3	246	12	1,048	1,294
Total Acres Protected		**1,379**		**4,789.04**	**6,168.04**
Total Acres In Region					**588,928**
%: Total / Protected					**1.05%**

Appendix C



the Penobscot Bay Conference

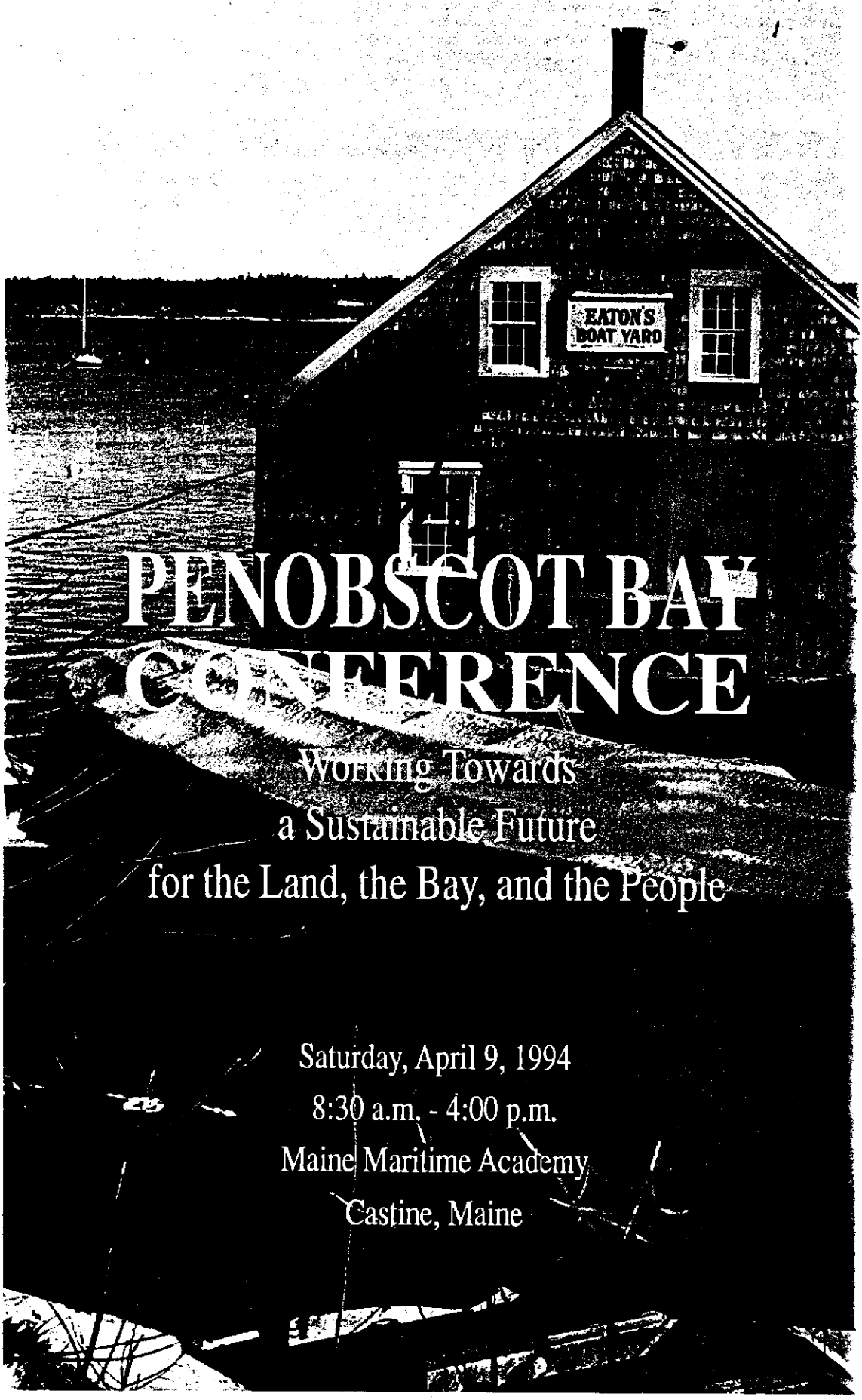
the Land, the Bay, and the People

Agenda for a Regional Network

Saturday April 10, 1993
Penobscot Marine Museum
Searsport, Maine

Proceedings prepared by the Island Institute
60 Ocean Street, Rockland, Maine 04841

Appendix D



PENOBSCOT BAY CONFERENCE

Working Towards a Sustainable Future for the Land, the Bay, and the People

Saturday, April 9, 1994

8:30 a.m. - 4:00 p.m.

Maine Maritime Academy

Castine, Maine

Appendix E

Annual Penobscot Bay Conference Held at MMA; Sessions Draw 140

By Penny-Jo Smith Clark

CASTINE—Everything from aquaculture to tips on regional planning to why people move to Downeast Maine was discussed at the second annual Penobscot Bay Conference at the Maine Maritime Academy this week.

More than 140 people turned out for the series of presentations and workshops held in MMA's Delano Auditorium on April 9, according to Ron Beard, conference organizer from the UM Hancock County Extension Office in Ellsworth.

MMA President Kenneth Curtis gave the opening address to start the daylong event Saturday, said John Staples, director of public relations at the academy.

"He talked about the necessity of drawing a balance between economic development and environmental protection. It's not a choice of one or the other in Maine. It's a matter of making it work in a collaborative effort, a joint effort, to create long-term sustainability," Staples said Tuesday.

Next, Les Watling, from the UM Darling Marine Center, showed a videotape of the "floor of the Penobscot Bay—which was of a lot of interest to people who skin-dive," Beard said.

Four major presentations came during the morning session of the conference. The first discussed how the Penobscot Bay Region is perceived by retirees as a place to live and buy goods and services. Panelists included Raymond and Jamie Doubleday, owners of a small woodworking firm in Warren, and Bill Grady of Bucksport, representing Champion International.

Michael Perry, from L.L. Bean, and Gary Ensworth, owner of the Phoenix Centre in Blue Hill, discussed whether or not the region had an attraction because of its historical heritage and ecosystem. If so, then how could it be marketed? Tammis Coffin, Friends of Acadia, provided counterpoints on how too many people coming into an area can begin to change cultural and natural resources, said Beard.

Sonny Sprague, Island Aquaculture Co. on Swan's Island, and Brian Beal, from UM in Machias, related issues surrounding salmon and soft-shelled clams during the Community Initiatives in Aquaculture portion of the seminar.

The final morning session entailed a look at the role of regional transportation advisory committees. Pat Jennings, Midcoast Regional Planning, and Bruce Hodson and Francis King with the MDOT in Augusta emphasized that communities "have a greater role to play advising the MDOT regarding road construction, traffic congestion, bicycle routes, and ferry schedules," explained Beard.

During the afternoon seminars, Robert Ho, executive director of the Maine Rural Development Council, led a panel discussion on how different agencies collaborate for regional planning. "Gladiators don't dance," Ho told the group. If people gear up to be adversaries, then they can't do a good job in collaboration. He urged folks to set the music and work together, Beard said.

Panelist Karin Tilberg serves on the Maine Environmental Priorities Project, a commission created by the Governor. She told those at the conference that her group is looking at what are the highest environmental risks to the state of Maine so that, with limited dollars, the state can focus on the most important problems first. The commission consists of environmental, business, and industry leaders—all working together to set procedures for determining priorities. The project originated from the College of the Atlantic, Beard said.

Smaller workshops were held throughout the afternoon. Beard said, overall, he was pleased with the conference.

"We brought people together from diverse backgrounds and provided them with a chance to talk with one another," he said.

Over the next year, many of those involved in the conference will network to form a specific action plan. They will explore successful programs at work in Maine and other countries as they work on a plan for the Penobscot Bay area, he said.

Will there be a third annual conference next year? "Oh, who knows? It depends on how much these people talk with each other. It may make sense to do a third," said Beard.

F1

COMPASS

March 10, 1994

EVENTS AND ACTIVITIES SECTION
Regular supplement to Castine Patriot, Island Ad-Vantages, and The Weekly Packet

Penobscot Bay Conference April 9 in Castine

CASTINE—Twenty years ago the issues were framed as "payrolls or pickerel," trying to determine a middle course to protect jobs and natural resources. Today's dialogue uses words like sustainability, an ecosystem approach, and quality of life. It is that dialogue that organizers of The Penobscot Bay Conference hope to continue at a second day-long session on Maine's largest bay and watershed.

"Last year we focused on understanding what we knew about the bay, its people, and the land uses of the region. This year we'll attempt to look at how we can sustain the region, tending to both economic and environmental benchmarks," said Ron Beard, University of Maine Cooperative Extension, and one of the planners for the conference. The day-long session, set for Saturday, April 9, is being hosted by Maine Maritime Academy in Castine.

Kenneth M. Curtis, President of Maine Maritime Academy, and former governor of Maine and US Ambassador to Canada, will provide a keynote address. He is expected to comment on the potential for local sustainability even as work proceeds toward sharing opportunity and responsibility for larger maritime resources of the Gulf of Maine.

Curtis will be followed by an illustrated "anatomy of the bay," presented by Dr. Les Watling of the University of Maine Darling Marine Center.

The idea for the conference stems from a visit to the bay region in 1991 by a team of land use experts from the US, Canada, England, and Wales. Under the auspices of the Vermont-based Countryside Institute, the study team observed the "world class" cultural and natural resources of the bay area and recommended attention by local land trusts to develop a regional identity and protect the "working landscape" devoted to agriculture, forestry, and maritime industry.

An evaluation by participants in last year's conference led organizers to increase their focus on the role of local business and industry, as well as local elected officials, said Mike Bush of Eastern Maine Development Corporation, a conference sponsor. "One session will look at the relationship between quality of life and the significant economic contributions of retirees and others who are attracted to the region," he said. Bush and Pat Jennings of Mid Coast Regional Planning are also organizing a session on the community role in aquaculture, looking to the recent Island Institute experience with salmon culture on Swans Island, which sits at the easternmost edge of the Bay.

In addition to these sessions, panels will discuss transportation issues for Penobscot Bay and the surrounding communities and trends in "ecotourism" that respond to visitor interest in learning more about the natural and cultural resources of the region. Afternoon workshops will highlight collaboration between communities and agencies, with participation by members of the Maine Environmental Priorities Project and others.

Following the close of sessions, participants will be able to celebrate the music, poetry, and scenery of the Bay in the Penobscot Punch Festival, co-sponsored by Maine/NH Sea Grant Marine Program. The festival will feature the musical groups Old Grey Goose and Trillium, with readings by Bill Carpenter, Stuart Kestenbaum, Kathleen Lignell, Jack Merrill, Sylvester Pollet, and Susan Shetterly and a multi-image program by photographer Sherman Habrouck.

Advance registration for the conference is required due to space limitations. Information on the proceedings and registration for the 1994 conference are available from University of Maine Cooperative Extension in Ellsworth, at 667-8212 or 800-287-1479.

Aquaculture tops conference agenda

By Kathy Harbour
Of the NEWS Staff

CASTINE — Aquaculture ventures are writing a promising chapter in the history of Maine's economic and environmental links to the sea, according to the general manager of a salmon aquaculture business on Swans Island.

Sonny Sprague of the Island Aquaculture Co. spoke Saturday at the Penobscot Bay Conference at Maine Maritime Academy. It was the second consecutive year for the conference that drew more than 100 people who considered the economic and environmental health of the region at several workshops during the day.

As a lifetime resident of a year-round island community, Sprague said the aquaculture business provides a livelihood to island residents while preserving the environmental health of the coastal waters.

Ken Curtis, president of MMA, underlined the importance of marine industries in his opening remarks. Listing Maine's three basic resources — people, forests and the ocean — Curtis said action must be taken to protect the sea.

Sprague explained how he and others had turned to the sea to ensure the long-term health and vitality of their year-round island community that had seen its young people leave and never return for lack of employment opportunities.

The former Swans Island selectman and a handful of others on the island in Frenchman Bay purchased the financially ailing company last year and managed to turn a profit. The bitterly cold conditions this winter spelled near disaster for the penned fish but quick processing saved the lot.

For Sprague and many others on Swans Island, aquaculture is providing a livelihood to the island community that historically has made its living from the sea.

Carter Newall of Great Eastern Mussel Farms in St. George explained how shellfish production is a good economic argument for clean water. Newall, who has played an active role in research into aquaculture, said a successful aquaculture venture must be built on sound environmental policy.

Newall said that research about eelgrass has proven that the marine flowering plant is vital for many species of coastal marine life, such as juvenile fish and shellfish, particularly young mussels. That information, Newall said, demonstrates the connections between economic and environmental health.

According to Les Watling of the University of Maine's Darling Marine Center, Penobscot Bay is home for at least 1,000 species of invertebrate animals and a perfect place for aquaculture.

BANGOR DAILY NEWS April 11, 1994

Ecotourist still elusive quarry for planners

Turning around Maine's traditional notion of mass-based tourism to capture the growing trend toward ecotourism will be difficult but not impossible, according to participants at last week's second annual Penobscot Bay Conference.

The conference, sponsored by the University of Maine Cooperative Extension Service and held at the Maine Maritime Academy in Castine, explored ways to create a "sustainable future" for the Penobscot Bay region. Ecotourism, which encompasses dispersed recreation as well as educational and cultural travel, was one economic opportunity explored by the more than 200 participants.

James Bernard, director of the natural resources division of the State Planning Office, pointed out that ecotourism contains a built-in conflict between promoters of what he called "special places" tourism and the conservationists' fear that special places will suffer environmentally if more tourists discover them.

Bernard said Maine tourism operators must first embrace a conservation ethic that is protective of natural resources rather than consumptive. Current tourism promotion, he said, focuses on moving masses rather than on developing niches.

"If you don't have the ethic, then you shouldn't be in the ecotourism business," Bernard said. "And the sad truth is that tourism groups and natural resources groups here don't even talk to each other."

Absent from the discussion in Castine were working members of the tourism community. Jim Thompson of the Maine Publicity Bureau said he was not aware of the conference and John Johnson of the Maine Office of Tourism said his office did not receive an invitation.

Mass tourism in Maine has focused on outdoor recreation, shopping and destination attractions such as Acadia National Park, all needing a large capital investment in highways, hotels and restaurants. Ecotourism attempts to get travelers out of their cars and deeper into a host community and its working environment. Some examples in the Penobscot Bay region include bicycle tours between bed & breakfast inns, day trips aboard working lobster boats, working farm vacations and sea kayaking.

But Cate Cronin, executive director of the Maine Island Trail Association, which manages some 40 islands for the Maine Bureau of Public Lands with a staff of two and an army of volunteers, said the need for what she called "front-line education" overwhelms the resources. Cronin said her group hopes to enlist assistance from merchants and tour organizers to help educate travelers in "leave no trace" techniques as well as property access rules.

Tammis Coffin of Friends of Acadia said her group is fighting a losing battle in educating visitors to Acadia National Park on how to respect sensitive natural areas in the park. She said the goal of preserving undiscovered, pristine places in Acadia is trampled each year beneath the feet of 4 million visitors, and her group is planning a survey this summer designed to shed light on the importance of the park's natural resources to the local economy.

Ecotourism's low public profile could be a result of the way tourism is measured. Johnson of the Maine Office of Tourism said tourism revenues are tracked through lodging and restaurants, not outdoor gear, cottage rentals or other, less direct travel spending. State advertising focuses mainly on the Maine image ("The Way Life Should Be"), and contains little specific information on alternative travel resources.

The demographics of the ecotraveler, however, cannot be ignored by tourism promoters, according to conference participants. They point to an upscale, educated, affluent target market, whose smaller numbers bring higher returns with less impact on the resource.

Johnson acknowledged the need for collaboration between natural resource planners and promoters, but he said his Office of Tourism was charged with promotion, not planning.

"We need to identify, first, then plan and then promote," Johnson said.

Bernard of the State Planning Office took up the challenge.

"We'll make the first move," Bernard said, "if someone puts up the money." *(By Ruth Robinson)*

MAINE TIMES April 15, 1994

Penobscot Bay Conference set for April 9 at MMA

Future, health focus of session

By Kathy Harbour
Of the NEWS Staff

CASTINE — The health and future of Penobscot Bay will be the focus of a daylong session at Maine Maritime Academy in April.

The session, set for Saturday, April 9, will be a follow-up to last year's session on Maine's largest bay and watershed.

According to Ron Beard of the University of Maine Cooperative Extension and a planner for the session, The Penobscot Bay Conference will "look at how we can sustain the region, tending to both economic and environmental benchmarks."

More than 250 participants attended the conference last year, with a focus on understanding the inhabitants and land uses of the region.

According to information released by Beard about the conference, participants decided last year to concentrate on the role of local business and industry and local elected officials, all with an eye on the region's long-range sustainability.

This year, MMA President Kenneth Curtis will kick off the discussion for the day by delivering a keynote address. His comments are expected to focus on the potential for local economic and environmental vitality in Penboscot Bay.

As explained by Beard, Curtis will present his views on local sustainability, "even as work proceeds toward sharing opportunity and responsibility for larger maritime resources of the Gulf of Maine."

Beard said the impetus for such a conference began when a team of land-use experts from the United States, Canada, England and Wales visited the bay region in 1991.

The team, under the auspices of the Vermont-based Countryside Institute, observed what they considered the world-class cultural and natural resources of the bay.

The team recommended that local land trusts develop a regional identity and work to protect a landscape that is devoted to agriculture, forestry and maritime industry.

A number of sessions are scheduled for the conference. An illustrated "anatomy of the bay" will be presented by Dr. Les Watling of the University of Maine Darling Marine Center.

Another session will consider the relationship between quality of life in the bay area and the economic contributions of retired people and others who have been attracted to the region.

Mike Bush of Eastern Maine Development Corp. and Pat Jennings of Mid Coast Regional Planning are organizing a session on the community role in aquaculture. That session will consider the Island Institute's recent experience with salmon culture on Swans Island.

The conference also will include panel discussion of transportation issues for the bay area and surrounding communities and trends in eco-tourism.

Afternoon workshops will look at collaborative efforts between communities and agencies, with participation by members of the Maine Environmental Priorities Project.

The music, poetry and scenery of the bay will be celebrated at the close of the session with the Penobscot Punch Festival, co-sponsored by Maine/New Hampshire Sea Grant Marine Program.

The festival will feature the musical groups Old Grey Goose and Trillium and readings by Bill Carpenter, Stuart Kestenbaum, Kathleen Lignell, Jack Merrill, Sylvester Pollet and Susan Shetterly. Photographer Sherman Habrouck will present a multi-image program.

In addition to the Cooperative Extension, the conference is sponsored by the Penobscot Bay Land Trust Alliance, the Island Institute and these 10 other groups:

EMDC, MMA, Maine Aquaculture Association, the Maine Coastal Program and State Planning Office, the Maine/N.H. Sea Grant Marine Advisory Program, the Maine Department of Marine Resources, Mid-Coast Regional Planning Commission, Penobscot River and Bay Institute, Penobscot Marine Museum, and Penobscot Center for Marine Studies.

Advance registration is required for the conference. For background information or to register, call 667-8212 or 1-800-287-1479.

Appendix F

DRAFT

STATE OF THE BAY REPORT

PENOBSCOT BAY - STATUS AND TRENDS

A Report on the Economic and Environmental Health of the Penobscot Bay Region

BACKGROUND

For the past two years The Island Institute has been a member of the Penobscot Bay Steering Committee which has organized two Penobscot Bay Conferences. These conferences which were well attended (200 citizens, conservationists, businesses, municipal officials) began a discussion of how traditional industries and emerging economic interests can utilize natural resources of the region in an environmentally responsible manner.

Several charges were made to the Steering Committee as a result of the conferences to encourage a regional identity for Penobscot Bay. Specifically suggestions were made to distribute more educational materials on the region, especially a State of the Bay Report and a Scientific Bibliography. The Island Institute, seeing this as part of our ongoing mission to act as a clearinghouse of information relevant to the islands and waters surrounding them, offered to lead these specific projects in Penobscot Bay. The projects are well suited to our organizational goals and strengths because we are very much interested in the connection between the islands and waters of Maine, and have prided ourselves in our publications background, including the annual Island Journal and our bi-monthly newspapers, the *Working Waterfront* and the *Inter-Island News*. Penobscot Bay is Maine's largest bay and it contains more islands than any other bay along the coast.

STATE OF THE BAY REPORT

Mission Statement:

The purpose of the State of Penobscot Bay Report is to generate public awareness of the bay and to advance the concept of an interconnected watershed by identifying broadly-defined cultural, economic and ecological trends. The State of the Bay Report will identify gaps in knowledge and highlight trends which have the potential to bring about change on a regional scale.

Assumptions:

1. that the Penobscot River watershed is the second largest in the Gulf of Maine (after the Saint John) and it is therefore of major ecological importance, and

2. that the trends selected are important because they indicate forces of change at work in the region.

Audiences:

The book is intended to be easily accessible to the following: municipal officials, including planning board members, managers and selectmen; land trust and conservation community; high school and college educators; legislators; civic groups; business community; scientists; and interested citizens.

REPORT STRATEGY

The State of the Bay Report will be organized around three primary areas, including trend indicators, risk factors and specific case studies. In the Report we will develop a series of practical, measurable indicators that are reliable for long-term analysis of change. For example, one of the major economic enterprises in the region is Champion International, a pulp and paper company in Bucksport near the mouth of the Penobscot River. Penobscot Bay is also the center of Maine's prime lobster grounds and supports the highest landings of lobsters than any other bay on the coast of Maine. What are the trends of these two industries?

The Report will identify known risks and their significance to the health of the bay. What is the stability of the resources on which major economic and ecological resources depend? What factors affect that stability, locally and globally? What are the known risks and how serious are they?

As a strategy to show the impacts of the significant trends, the Report will look at 4-6 communities that are on different paths and discuss the implications of certain choices these communities have made.

PROPOSED TABLE OF CONTENTS

I. MISSION

II. ASSUMPTIONS

III. INTRODUCTION

IV. TREND INDICATORS

Each section will look separately at these two factors:
- Historical Status (will look back over last 50 years)
- Current Status

A. **Ecological Trends**
1. The River and its watershed
2. Marine Resources (including water quality)
3. Wetlands
4. Land Cover
5. Wildlife Biodiversity
6. Air Quality

B. **Social and Cultural Trends**
1. History
2. Demographics (in migration and out migration)
    a. young people
    b. unemployed
    c. retired
    d. summer visitors
3. Transportation patterns
4. Land Use changes

5. Recreation
6. Stewardship (water quality monitoring, land trusts...)
7. Institutions: Educational, Cultural, Scientific (How have their missions changed over time?)

C. **Economic Trends**
1. Fishing
2. Transportation
3. Tourism
4. Energy
5. Forest Products
6. Boat building
7. Agriculture
8. Aquaculture
9. Manufacturing
10. Creative Industries: artists, craftsmen...

V. RISK FACTORS

A. Industrial/Municipal Discharges
B. Non-point source pollution
C. Marine Environment
D. Transportation
1.. Passenger: rail and highways
2. Commercial: rail, marinas and cargo port
E. Tourism

VI. COMMUNITY PROFILES

These profiles of communities in transition within the watershed will illustrate important trends. The watershed can be divided into four general areas represented by the following:

A. River Towns
B. West Bay
C. East Bay
D. Islands

VII. OPTIONS FOR THE FUTURE

Gaps in available research, significant trends....

VIII. SUMMARY

Toward a regional identity

IX. APPENDICES

Scientific Bibliography
Jurisdictional Agencies

REPORT LAYOUT

length:	140 pages
format:	10 x 10, with one color signature
market:	bookstores, close to *Island Journal* quality
copies:	2,000

TIME LINE

October thru December - gather data
April 30 - circulate draft of report
June - in production
September 1995 - publication date

Appendix G

Hancock County Planning Commission

R.F.D. #4, Box 22, Ellsworth, Me. 04605 (207) 667-7131

February 24, 1995

National Estuary Program
Environmental Protection Agency
Washington, D.C.

To whom it may concern:

This is a letter of support for the State of Maine's application to establish a National Estuary Project for Penobscot Bay. This application represents an important step in efforts to improve the health and productivity of the Bay. The marine resources of Penobscot Bay have always played an important role in Hancock County's economy.

It is particularly important to support efforts to restore areas that have been closed to shellfishing since they represent a vital source of local jobs and income. Hancock County's median income is lower than the state average. Further erosion of our fragile marine resources would mean even more limited economic opportunities in the future.

We hope that you will fund this important application. I would be more than happy to discuss its merits with you at greater length. Feel free to call me at 207-667-7131 if you have any questions.

Sincerely,

Thomas E. Martin, AICP
Executive Director

CASTINE CONSERVATION TRUST
BROOKSVILLE • CASTINE • PENOBSCOT
Box 421 • Castine, Maine 04421

February 28, 1995

Environmental Protection Agency
Washington, D.C.

Dear Sirs:

As the coordinator for the Bagaduce Water Watch, a citizen volunteer group performing water quality monitoring, I strongly support the proposal to establish a National Estuary Program in Penobscot Bay.

Our group has completed the second year of a five-year project to gather baseline data on temperature, salinity, dissolved oxygen and fecal coliform bacteria in marine waters of the Castine shoreline.

Water quality monitoring at additional sites in Penobscot Bay needs to become a reality to make possible the opening of new and old shellfishing areas.

I believe a National Estuary Program in the bay area will assist community action on a variety of environmental problems including shellfish closure due to pollution.

Sincerely,

Donald E. Blomquist
Donald E. Blomquist

TOWN OF ISLESBORO
PLANNING BOARD
P.O. Box 76
Islesboro, ME 04848

March 1, 1995

National Estuary Program
U. S. Department of Environmental Protection
Washington, DC

RE: National Estuary Program in Penobscot Bay, (NEP)

To Whom it May Concern:

In 1980 approximately 4,640 bushels of clams were harvested from Islesboro's clam flats. In previous years those flats sustained a number of clam diggers, both resident islanders and non-residents. During the 1960s and early 1970s the shellfish harvest was large enough to sustain a clam processing plant. Since the early 1980s the clam population has all but died out. Re-seeding the clam flats has had limited success. There are many theories regarding the reasons for the loss of the clam population and its resulting economic loss to the community. What is clear is that the cause for this loss is not local, but rather a result of factors which affect the entire estuary system that nourishes Penobscot Bay.

Islesboro's 1994 Comprehensive Plan recommends development and adoption of a Marine Management Plan. Any plan of this type will be of limited use unless there is regional management of the estuarine system. The Comprehensive Plan also supports regional cooperation to this end.

For this reason alone, the NEP is worthy of support. However, with new pressures affecting the health of Penobscot Bay, not the least of which will be the proposed cargo port at Sears Island, regional cooperation to balance economic and environmental concerns is vital for a healthy and productive Penobscot Bay.

Therefore, we support the Penobscot Bay Network's goal to establish a National Estuary Program in Penobscot Bay.

Very truly yours,
TOWN OF ISLESBORO
PLANNING BOARD

Marc V. Schnur, Chairman

MVS:mm
c. SMILLER

Town Of Castine

Municipal Offices

P.O. Box 204 • Castine, Maine 04421
Telephone: (207) 326-4502 • FAX: (207) 326-9465

March 1, 1995

Steve Cole
Department of Economic & Community Development
Coastal Program
State House Station 130
Augusta, ME 04333-0130

REF: National Estuary Program Support

Dear Steve,

The Town of Castine supports the efforts of the State Department of Economic & Community Development's efforts to improve the Penobscot Bay area. We applaud your pursuit of a Federal grant from the Environmental Protection Agency to explore methods of increasing the shellfish harvesting industry in the Bay area.

We stand ready to assist your efforts in this endeavor and solicit the approval of your grant request.

For the Board of Selectmen

Respectfully,

Richard E. Robinson
Town Manager

CITY OF Bangor MAINE

73 HARLOW STREET
BANGOR, MAINE 04401
TEL. 207/945-4400

DEPARTMENT of COMMUNITY and ECONOMIC DEVELOPMENT
Kenneth R. Gibb, Director

Planning Division

February 28, 1995

The National Estuary Program
Environmental Protection Agency
Washington, DC

Dear Sir or Madam:

It has come to our attention that the Penobscot Bay Network is filing an application for a multi-year water quality study of the Penobscot Bay Region Watershed. As a major urban center on tidal waters of the Penobscot River, we share a number of common concerns with others on the lower river and in Penobscot Bay itself as to the future of the estuary and its resources.

We would like to note our interest in and support of the proposed project which may shed light on some of the major current environmental issues in the Penobscot Bay area and which may provide for an opportunity to deal with these conditions at a meaningful, watershed level.

The City has actively pursued the reuse and upgrading of the Penobscot River and supported extensive efforts to improve water quality in the river. We would be very interested in such a project, if it furthered those goals.

Sincerely,

Ken Gibb

Kenneth R. Gibb
Director of Community and
Economic Development

KRG/j

Town of Penobscot

TOWN OFFICE
PENOBSCOT, MAINE 04476

National Estuary Program
Environmental Protection Agency
% Steven Cole
DECD Station #130
Augusta, Me. 04333

Dear Mr. Cole:

The Board of Selectmen of the Town of Penobscot on the eastern shore of Penobscot Bay declares by this letter its support of The Penobscot Bay Network in its request to the National Estuary Program for a grant to be used to initiate a program that will have the effect of eventually restoring both the public and commercial harvesting of shellfish in this area.

Sincerely,

200TH ANNIVERSARY
1987

March 3, 1995

Mr. Steve Cole
Maine Coastal Program
Office of Community Development
State House Station #130
Augusta, Maine 04333

RE: Penobscot Bay Network's National Estuary Project Application

Dear Steve,

As a planner, in a coastal community, having seen several studies and reports on the Penobscot River and coastal Maine; it is excellent to see someone propose a comprehensive review of the entire system. The goals outlined by the Penobscot Bay Network will help define a long term, sound management plan for Penobscot Bay which balances the interests of the waterway as an industrial/recreational transportation link as well as an sensitive ecological system. I would support the Penobscot Bay Network's application for funding from the National Estuary Program.

I wish all those involved good luck through the selection process, and hopefully the Town of Hampden will be involved in the project once it's up and running.

If I can be of any further assistance, please feel free to call me at 862-6527.

Sincerely,

David G. Gould, AICP
Town Planner

HAMPDEN
BICENTENNIAL
1794-1994

TOWN OF ISLESBORO
P.O. BOX 76
ISLESBORO, MAINE 04848
(207) 734-2253
FAX NO. 207-734-8394

DAMARIS A. DIFFIN
Town Manager

February 28, 1995

To: The Environmental Protection Agency

From: Earnest Batchelor
Chairman of the Islesboro Shellfish Association

Re: Support for a National Estuary Program In Penobscot Bay.

The Islesboro Shellfish Association ardently supports the formation of a National Estuary Program in Penobscot Bay. The bay environment surrounding our island once supported a flourishing population of shellfish and other economically valuable marine organisms. Over the past ten years we have watched the demise of these once prolific populations, particularly the soft-shell clam.

In an effort to bring back the soft-shell clam, the Shellfish Association has conducted a number of conservation practices. These include;

1. Seeding of three areas with over 1.5 million seed clams.
2. Closure of potential sites to the harvesting of all marine organisms.
3. Analysis of Clams for viral infections by the Woods Hole Marine Laboratory.
4. The elimination of all commercial town licenses.
5. Collaboration with the Islesboro Water Quality Group in monitoring the local marine environments.

We are extremely disappointed that the seeding projects have failed. There are no indications that the closed flats are making a natural comeback. What is happening to the marine environment of Penobscot Bay?

Our island link in Penobscot Bay is substantially affected by the decisions of all who are associated with this irreplaceable resource. We disparately need a regional management program ensuring the posterity of the bay for all future generations. Again, without hesitation, the Islesboro Shellfish Association strongly supports the National Estuary Program.

Sincerely,

Ernest Batchelor

Ernest Batchelor
Islesboro Shellfish Association Chairman

State of Maine County of Knox

We, the undersigned Municipal Officials

of the Town/City of

Matinicus Isle PT.

hereby state our support and endorsement of the

Penobscot Bay Network application to the Environmental Protection Agency for Penobscot Bay to be considered for a National Estuary Project.

Signed on the 22 day of Feb., 1995.

Clayton L Millard
~~Mayor~~ or Chairman of the Board of Selectmen

Elaine Crowley
~~Councilor~~ or Selectman

Councilor or Selectman

Councilor or Selectman

Councilor or Selectman

State of Maine *County of* Knox

We, the undersigned Municipal Officials

of the Town/City of

Owls Head

hereby state our support and endorsement of the

Penobscot Bay Network application to the Environmental Protection Agency for Penobscot Bay to be considered for a **National Estuary Project.**

Signed on the 22 day of February, 1995.

Carolyn M. Philbrook
~~Mayor~~ or Chairman of the Board of Selectmen

J W Christie
~~Councilor~~ or Selectman

Kay R. Dodge
~~Councilor~~ or Selectman

Councilor or Selectman

Councilor or Selectman

State of Maine *County of* WALDO

We, the undersigned Municipal Officials

of the Town/City of

LINCOLNVILLE

hereby state our support and endorsement of the

Penobscot Bay Network application to the Environmental Protection Agency for Penobscot Bay to be considered for a National Estuary Project.

Signed on the 27 day of FEBRUARY, 1995.

Ernest Littlefield
Mayor or Chairman of the Board of Selectmen

Charles Boetsch
Councilor or Selectman

Robert Ingalls
Councilor or Selectman

D. Isaac Colby
Councilor or Selectman

Councilor or Selectman

State of Maine *County of* Knox

We, the undersigned Municipal Officials

of the Town/~~City~~ of

Rockport

hereby state our support and endorsement of the

Penobscot Bay Network application to the Environmental Protection Agency for Penobscot Bay to be considered for a National Estuary Project.

Signed on the 27th day of February, 1995.

Mayor or Chairman of the Board of Selectmen

Councilor or Selectman

Roger D Jones
Councilor or Selectman

Marjorie C Jones
Councilor or Selectman

Councilor or Selectman

Appendix H

Penobscot Bay Conference Agreement

EPA guidance for the National Estuary Program requires that a draft "conference agreement" be contained in the documents submitted by a state when nominating an estuary. The agreement is to *"describe the activities, products, and schedules by which the management conference will complete its Comprehensive Conservation and Management Plan (CCMP) within three years".*

This draft Penobscot Bay Conference Agreement commits Maine to:

-- support the activities of the management conference and its participants through a project office;

-- take early action where problems and solutions have been identified and pursue long-term strategies; and

-- involve the public in the development and implementation of the CCMP.

Support Program Office

Maine will establish a Penobscot Bay National Estuary Program Office to provide the administrative and technical support necessary to implement the project, both in its development and implementation phase. The office will be located within the proposed project area.

Take Action at the State, Regional and Local Level

The State of Maine and its public and private partners around Penobscot Bay are requesting designation of the Bay so as to respond to three priority concerns:

-- Improve water quality to enhance the natural and economic values of the Bay;

-- Protect and restore terrestrial and marine habitats; and

-- Promote sustainable uses of the Bay's resources.

In pursuit of these three issues, and others subsequently identified, it is anticipated the Penobscot Bay CCMP will contain, among other things, the following:

-- an identification of priority problems of the estuary including a characterization of the estuary's status and trends, probable causes of environmental problems, and pollutant loadings;

-- a description of activities that will be pursued to respond to the priority problems identified;

-- an inventory and analysis of applicable Federal and state programs that complement and conflict with the CCMP;

-- a description of the costs of proposed actions and the identification of how such actions will be financed;

-- a Federal consistency report; and

-- a coordinated implementation and monitoring component.

Attachment 1 outlines the proposed timeline for work under the PBMC.

It is anticipated that the draft CCMP will be submitted within eighteen months of designation. The final CCMP will be completed within three years of the signed conference agreement and will identify action plans for implementing the CCMP, including a discussion of their likelihood of success, lead implementation agencies, funding required and a schedule for implementation.

Attachment 2 is a preliminary work plan and budget. It indicates the tasks that will be pursued with federal and non-federal funding.

Educate and Involve the Public

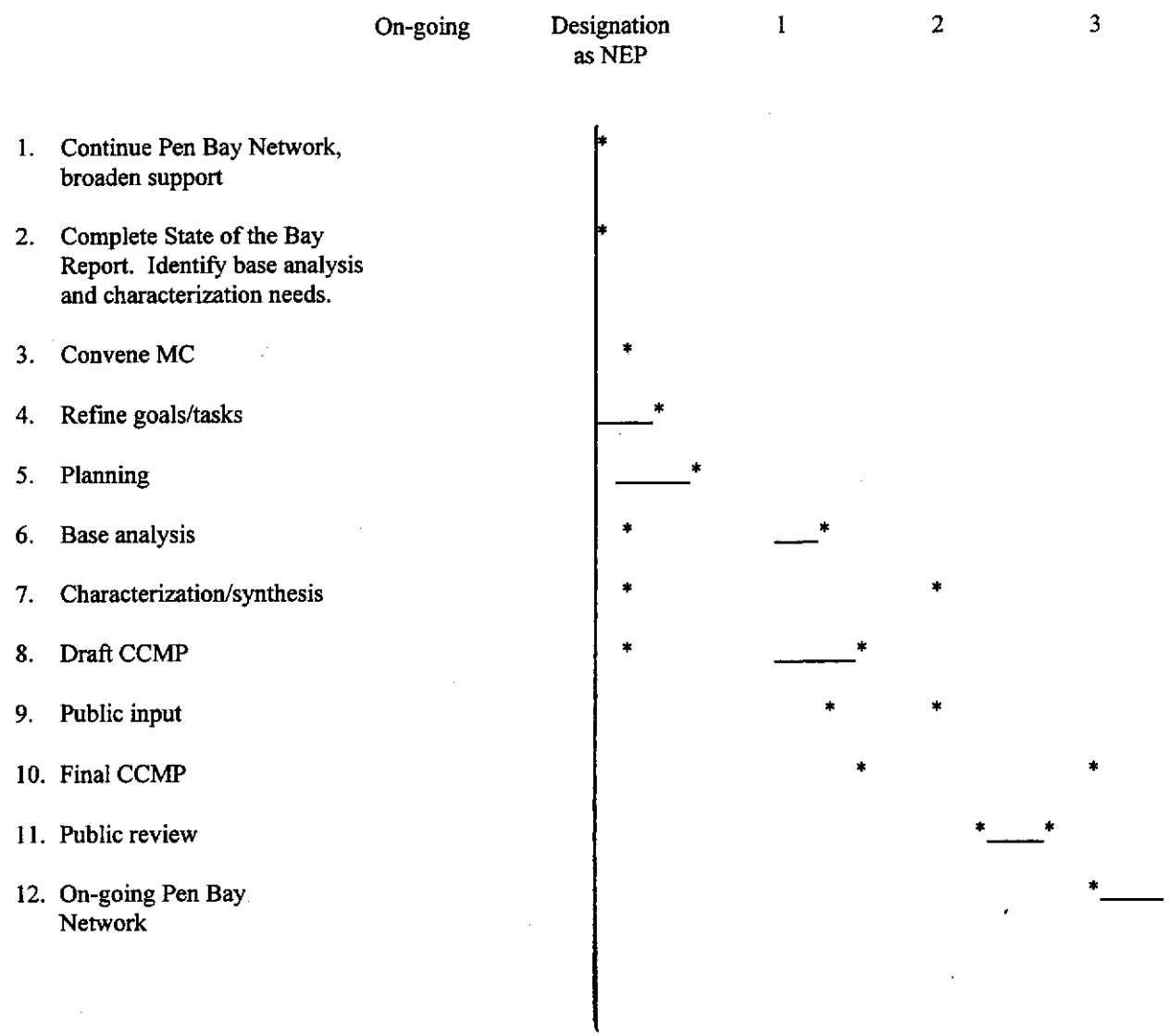
Development of the Penobscot Bay CCMP will require continued, extensive public outreach and involvement begun by the Penobscot Bay Network. This will be a fundamental element of our efforts over the three year period.

A public participation plan is one of the first tasks undertaken as part of this agreement. In addition, an annual conference highlighting the efforts and findings of the NEP will be needed.

Public involvement also will be formalized through a citizens advisory group that is part of the overall structure of the Penobscot Bay Management Conference.

Attachment #1

Proposed Timetable for Penobscot Bay NEP



Penobscot Bay Work Plan and Budget

1. Protect and Restore Water Quality

PROBLEM: Poor water quality in the Penobscot Bay Estuary has caused the closure of a substantial amount of shellfish areas causing economic hardships in some communities.

PROGRAM GOAL: Protect and restore water quality for natural resource and economic benefit.

OBJECTIVES (TASKS):

a) Increase potential productive shellfish flat acreage.

b) Identify, evaluate and reduce point source pollution sites (e.g. Toxic hot spots, especially metals, PCBs, Dioxin).

c) Evaluate and reduce non-point source pollution impacts on Penobscot Bay.

CCMP ACTIONS:

Within One Year –

Complete sanitary surveys, increase existing water quality monitoring efforts, assist communities in remediation.

Increase number of boat pumpout facilities.

Work with communities and DEP to remove licensed Overboard Discharges in critical shellfish harvesting areas.

Inventory sources of non-point pollution to identify those made up of potentially controllable point sources.

Initiate efforts to catalog urban and stormwater run-off and evaluate impact on water quality. Integrate with current efforts to produce impact statement regarding impacts.

Within Two Years –

Provide training for municipalities to establish shellfish committees and management plans. Conduct training for and carry out clam resource surveys.

Assist in evaluation of POTWs and their upgrades.

Research and assist with identification of innovative sewage treatment solutions for islands and small communities.

Determine industrial point source impacts in Penobscot Bay.

Establish a program of volunteers to investigate potential nonpoint sources in the estuary and work with agencies and landowners to better utilize best management practices for reducing impacts.

Assist in implementation of Maine's Small Communities Grant Program by providing a liaison between municipalities, homeowners and DEP during identification, granting process, and follow-up phases.

Within Three Years --

Evaluate the feasibility of implementation of stock enhancement and habitat restoration through research and pilot projects.

Enter into partnership with identified industries on innovative technology for reduced discharges to Pen Bay.

Work with Penobscot Bay schooner fleet to reduce boat sewage in the estuary.

Work with municipalities and agencies to facilitate enforcement of existing laws, regulations and policies regarding water quality.

LEAD RESPONSIBILITY: Penobscot Bay Management Committee

COOPERATING AGENCIES: Department of Marine Resources, University of Maine Cooperative Extension, State Planning Office, Department of Environmental Protection, Island Institute, Maine Aquaculture Innovation Center, Department of Economic and Community Development, Natural Resources Conservation Service.

RESOURCES:

Existing collaborations among the above-mentioned agencies.

Volunteer groups and municipalities coordinated through these alliances.

2. Protect and Restore Terrestrial and Marine Habitats

PROBLEM: Both land and estuarine habitat loss in the Penobscot Bay region has caused a decline in wildlife populations, some which are harvested commercially or recreationally.

PROGRAM GOAL: Implement habitat protection efforts in the estuary.

OBJECTIVES (TASKS):

a) Build partnerships with federal agencies and local government to promote better understanding of threatened species and their habitats.

b) Enter estuary resource and habitat data into Maine's Geographic Information System (GIS).

c) Promote use of habitat suitability models to identify priority marine species and their habitats.

d) Identify important habitats (flats, eelgrass beds, spawning areas) within the Penobscot Bay estuary.

e) Maintain or improve anadromous fish runs in the Penobscot and Ducktrap Rivers (Atlantic salmon, shad, smelt).

f) Protect valuable seabird habitat.

g) Minimize essential marine habitat impacts from dredging and dredge spoil disposal.

CCMP ACTIONS:

Within One Year --

Work with U.S. Fish & Wildlife Gulf of Maine Project to focus habitat suitability studies on the Penobscot Bay estuary.

Study chemical pollutants within the Penobscot River that may impact larvae of marine organisms.

Convene working group to determine priority species in Penobscot Bay that require habitat protection (criteria to include commercial value, rarity, biodiversity).

Establish working relationships with Atlantic Salmon Federation and other advocacy groups.

Within Second and Third Years --

Assist state agencies and municipalities seeking dredging permits to find alternatives to ocean disposal in Penobscot Bay, especially to protect spawning areas.

Work with municipalities & other partners to develop plans ensuring protection of important habitats from marinas, moorings and other marine uses.

Increase public awareness of the disturbance to island nesting birds from human and domestic animal activities.

Work with municipalities to ensure that island land use regulations achieve protection of nesting sites (some shoreland zoning ordinances zone only the perimeter as Resource Protection and leave the actual nest sites unprotected).

LEAD RESPONSIBILITY: Penobscot Bay Management Committee.

COOPERATING AGENCIES: Department of Marine Resources, Department of Environmental Protection, U.S. Fish & Wildlife Service, Department of Inland Fisheries & Wildlife, Island Institute, Atlantic Salmon Federation, regional planning agencies, Maine Office of GIS, Maine State Planning Office, and Penobscot Bay municipalities.

RESOURCES: Existing collaborations among the above entities.

3. Promote Sustainable Use of the Bay

PROBLEM: There is a pressing need to expand sustainable economic opportunities derived from Penobscot Bay, given the severe groundfish decline within the Gulf of Maine.

PROBLEM GOAL: Chart an economic future that does not degrade the natural resources of the estuary.

OBJECTIVES (TASKS):

a) Explore and support shellfish, finfish and seaweed aquaculture efforts within the estuary where appropriate.

b) Establish the economic value of the Penobscot Bay estuary.

c) Promote necessity of linkage between economic health and environmental integrity for long-term health and productivity of Penobscot Bay.

d) Define ways in which tourism in the estuary can be advantageous to sustainable economic growth.

e) Evaluate role of recreational uses of estuary & establish appropriate networks for encouraging low-impact uses.

f) Provide training for mediation in marine resource use conflicts within the estuary.

g) Explore means to assure that current shipping activities and those of the proposed Sears Island cargo port do not degrade estuarine water quality.

h) Support exploration & research of ecosystem models to manage fisheries in Penobscot Bay and throughout the Gulf of Maine.

CCMP ACTIONS:

Within One Year --

Conduct research on feasibility of aquaculture ventures within Penobscot Bay.

Conduct estuary-wide survey of income generated and jobs provided by Penobscot Bay fisheries, tourism, shipping, aquaculture and other marine-dependant industries.

Publish and disseminate the link between economic health and environmental integrity through existing distribution channels (e.g., Inter-Island News, The Working Waterfront which circulate to 5,000 island owners, businesses, conservationists, state agencies and coastal communities).

Assist in sponsorship of conferences and publications addressing ecosystem-based fisheries management models (e.g. Island Institute's System in the Sea).

Within Second and Third Years –

Provide technical assistance on start-up and financing for aquaculture ventures within Penobscot Bay.

Establish task force charged with cataloging sustainable recreational potential for Penobscot Bay.

Establish marine use conflict initiative for educating target groups - fishermen, shipping interests, recreation users, aquaculturists.

Provide educational materials for tourists and recreational groups on the fragility of the estuary's ecology.

Work with Penobscot Bay Pilots Association and the Maine Department of Transportation on feasible approaches to maintaining water quality in shipping.

LEAD RESPONSIBILITY: Penobscot Bay Management Committee

COOPERATING AGENCIES: Marine Hatchery Technology Association, Maine Aquaculture Innovation Center, Maine Aquaculture Association, Department of Marine Resources, University of Maine Sea Grant, University of Maine Cooperative Extension, Island Institute, Pen Bay Pilots Association, Department of Transportation, Maine Office of Tourism, Finance Authority of Maine, Eastern Maine Development Corporation.

RESOURCES: Existing collaborations among the above mentioned agencies and organizations.

4. Support Penobscot Bay Network

PROBLEM: Without conscious, ongoing efforts, the integrated network which has been created among the groups involved with Penobscot Bay and the proposed National Estuary Project could cease to sponsor many of the initiatives it has begun in recent years and could fail to continue beyond the duration of the NEP.

PROGRAM GOAL: Maintain efforts of the Penobscot Bay Network through the Penobscot Bay Estuary Project and plan for continuation of the network at the conclusion of the Estuary Project.

OBJECTIVES (TASKS):

a) Continue the full range of the Penobscot Bay Network activities.

b) Continue and expand existing educational program throughout the estuary watershed.

c) Continue and increase public participation.

d) Improve community-based networking.

e) Continue to promote and advance communication and coalition building.

f) Create central clearinghouse of information on the estuary for educational purposes.

g) Follow-up on key recommendations/action items from the first Penobscot Bay Conference.

h) Expand the scientific bibliographic list and widely disseminate the bibliography currently being produced by the Island Institute and the Isleboro Island Trust.

CCMP ACTIONS:

Ongoing (these items are likely to occur during and after the life of the National Estuary Project) --

Participate annually with the Pen Bay based Fisherman's Forum.

Work with the Maine Coastal Program on the Marine Volunteers project, an educational tool based in the Bay.

Plan for long-term continuation of Pen Bay Network activities without financial resources provided by the Pen Bay Estuary Project.

Assist Penobscot Riverkeepers 2000 with tours and educational programs for communities along the entire Penobscot River.

Conduct public meetings and conferences on estuary issues currently being addressed by the Pen Bay Network and the NEP.

Sponsor round-table meetings with specific stakeholders to discuss common agendas.

Distribute curriculum materials developed by the Penobscot Riverkeepers 2000 and the River and Bay Institute.

Identify partners to address issues/tasks related to their missions.

Within One Year --

Develop a public participation plan to help define issues for the NEP and build a constituency for long-term support.

Collaborate with the Island Institute by assisting with the publication, and future interpretation of the State of the Bay Report.

Hold a Sears Island Cargo Port Forum; continue to sponsor annual fora on public policy issues related to Penobscot Bay.

Within Two Years --

Expand pilot educational program "Septic System Maintenance", to cover targeted areas in the estuary.

Create a computer bulletin board on the Internet for Penobscot Bay where research materials, actions and questions can be asked by students, businesses, residents, municipalities, managers and educators.

Within Three Years --

Update the State of the Bay report and Penobscot Bay Bibliography at the end of 1998.

Prepare a work plan defining the first year of activities after the NEP grant period expires.

LEAD RESPONSIBILITY: Penobscot Bay NEP Management Committee

COOPERATING AGENCIES: All Penobscot Bay Network member groups and agencies. Specific items involve: Island Institute, Riverkeepers 2000, Penobscot River and Bay Institute, and Maine Coastal Program.

RESOURCES: Existing collaborations among the above mentioned agencies through the continuation of the network structure.

Draft Budget

This preliminary budget shows how Maine will use $500,000 (federal) and $125,000 (non-federal) over a three-year period.

GOAL	YEAR 1	YEAR 2	YEAR 3
Protect and restore water quality	$200,000	$200,000	$200,000
Promote sustainable use of Penobscot Bay	125,000	125,000	125,000
Maintain educational, outreach and public policy efforts of Penobscot Bay Network and plan for continuation of the network at the conclusion of the Estuary Project	100,000	100,000	100,000
Protect and restore terrestrial and marine habitats	200,000	200,000	200,000
Federal and non-federal funds	$625,000	$625,000	$625,000

State of Maine Non-Federal Cost Share

Maine's annual non-federal match of $125,000 per year for the three year grant period is derived from two sources: contributed time of state-funded Department of Marine Resources (DMR) employees and state technical assistance funds to regional planning commissions in the Penobscot Bay region.

Annual DMR staff contributed time	
Area biologist @ 50%	$25,000
2 Marine Specialists @ 50%	24,000
Microbiologist @ 25%	15,000
Laboratory Staff @ 25%	25,000
GIS/Data Manager @ 25%	15,000
TOTAL	$104,000
Annual State technical assistance funds to Regional Planning Commissions	
Hancock County Planning Commission	$2,500
Mid-Coast Regional Planning Commission	4,500
Penobscot Valley Council of Governments	14,000
TOTAL	$21,000
GRAND TOTAL	**$125,000**