LONG ISLAND SOUND COASTAL MANAGEMENT PROGRAM

Volume 2

April 1996

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BW037946

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The New York State Coastal Management Program is administered by the New York State Department of State, Division of Coastal Resources, 41State Street, Albany, New York 12231.

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LONG ISLAND SOUND
HISTORIC CENTERS OF MARITIME ACTIVITY

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HISTORIC MARITIME AREAS

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Ms. Gloria Rocchio
Mr. Edward J. Smits
Honorable James R. Stark

Secretary of State
Alexander F. Treadwell

Commissioner
Bernadette Castro

Acting Commissioner
John P. Cahill

Spring, 1997

Dear Secretary Treadwell:

On behalf of the Historic Maritime Areas Advisory Committee, it is my pleasure to transmit the final report, Long Island Sound Historic Centers of Maritime Activity. We have identified the special resources of historic maritime communities and what measures could be taken to preserve their heritage.

During the past year, the Committee has discussed how best to reverse the loss of our maritime tradition, as we found to be the current trend. We visited all 17 designated maritime communities at least once and listened to local officials, operators of maritime businesses and historic sites, natural resource managers, and residents. Our recommendations in response to what we heard are outlined in the report.

While recognizing the State's fiscal constraints, the Advisory Committee proposes a comprehensive strategy that builds on and improves existing programs of federal, State and local governments, in partnership with the private sector. Implementation of these recommendations will provide educational, inspirational, economic, and recreational benefits for present and future generations. Our historic working waterfronts will be stronger and healthier.

Let me close by saying what a delight your staff at the Department of State, along with staff from the Office of Parks, Recreation and Historic Preservation, have been to work with. All of us on the Advisory committee have been very impressed by their professionalism and dedication.

With kindest regards.

Respectfully submitted,

Thomas L. Pulling
Chairman

c: Commissioner Bernadette Castro

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◆ NYS Department of State • 41 State Street • Albany, New York 12231 (518) 474-6000 FAX (518) 473-2464

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Chapter 587, Laws of 1994

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§ 3444. Flood insurance notice

1. Insurers shall provide to their homeowners and dwelling fire personal lines insureds a notice prescribed or approved by the superintendent, explaining clearly and in plain language that: (a) such policies do not provide coverage for loss caused by mudslide or flood; and (b) insurance is available under separate policies issued in accordance with the National Flood Insurance Program, 42 U.S.C. § 4001 et seq., including information regarding flood insurance eligibility and access.

2. The provisions of this section shall apply to any homeowners policy or dwelling fire personal lines policy upon the first renewal of such policies, and to all such policies newly issued, on and after the effective date of this section.

§ 2. This act shall take effect 180 days after it shall have become a law, except that all actions necessary to prepare for the implementation of this act shall be taken prior to such date.

LONG ISLAND SOUND HISTORIC CENTERS OF MARITIME ACTIVITY—STUDY

CHAPTER 587

A. 9954-B

Approved and effective July 26, 1994

AN ACT to provide for a study of Long Island Sound historic centers of maritime activity

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

§ 1. Legislative findings. The legislature finds that the department of state's Long Island sound coastal management program identifies several communities located on the sound as historic centers of maritime activity. Ten contain designated maritime centers—sheltered bays and harbors that contain water-dependent businesses like marinas, yacht clubs, commercial fishing operations, ferries and commercial ports. Because these areas have been utilized for maritime purposes for decades, they also contain valuable historic resources. These historic maritime communities warrant special recognition and state support to ensure appropriate protection and use.

The legislature further finds that the Long Island Pine Barrens maritime reserve was established, in part, to preserve, interpret and beneficially use the reserve's historic resources which includes resources in maritime communities through the planning and implementation of a management program.

The legislature further finds that the state historic preservation program and urban cultural park program offer, respectively, techniques to foster the preservation and management of historic properties as living parts of the state's communities and an approach for communities to strategically plan for preservation, recreation, education and economic development in an integrated and partnership manner.

Therefore, the legislature finds that the opportunity exists through existing state programs and in partnership with local governments and private entities to identify, recognize, preserve and foster the beneficial enjoyment of the historic and cultural resources associated with maritime activity on Long Island Sound.

§ 2. The secretary of state, with the assistance of the commissioner of the office of parks, recreation and historic preservation and the commissioner of the department of environmental conservation, shall prepare or cause to be prepared a schematic study on the identification, recognition, preservation and beneficial enjoyment of the historic, recreational, commercial and cultural resources in communities along Long Island Sound and Peconic Bay associated with maritime activities which shall include recommendations on the formation of a program

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to provide educational, inspirational, economic and recreational benefits for present and future generations. The communities considered under the study shall include but need not be limited to the village of Port Chester, village of Mamaroneck, city of New Rochelle, City Island, Port Washington, city of Glen Cove, Oyster Bay, Huntington Harbor, Northport Harbor, village of Port Jefferson, Mattituck, Stony Brook, Setauket, village of Sag Harbor, village of Greenport, Cold Spring Harbor and Orient-Oyster Ponds.

§ 3. In preparation of such study:

a. The secretary of state shall give notice of the study to the chief executive officer of each city, town or village considered under the study;

b. The secretary of state shall identify and review for consistent recommendations and applicable models, all existing plans and studies relating to the purposes of this study including but not limited to the Long Island Sound Coastal Management Program, local waterfront revitalization programs and scenic areas of statewide significance;

c. The commissioner of parks, recreation and historic preservation shall identify sites on the state and national registers of historic places in the communities considered under the study and inventory other historic resources within such communities which contribute to the special character of the maritime community;

d. The commissioner of parks, recreation and historic preservation shall review the urban cultural parks program to identify elements which may be applicable to designation, development, financing and management of a program of historic maritime communities;

e. The commissioner of environmental conservation shall identify significant natural features and important natural habitats, with special emphasis on the habitats of commercially valuable species, whether historical or present, in and areas adjacent to the communities considered under the study so that the study may reflect the relationship among the environment, commerce and the community and recommend measures that will enhance the natural resources;

f. The secretary of state and the commissioner of parks, recreation and historic preservation shall jointly appoint an advisory committee of at least 11 members which shall include representatives of local government, maritime activities, historic preservation organizations and educational institutions in the study area and shall advise the secretary of state on preparation of the study. The chair shall be appointed by the secretary; and

g. The secretary of state shall hold at least two public meetings convenient to the communities considered under the study promptly following the release of the preliminary report with written notice of such hearing to the chief executive officer of each city, town or village considered under the study and public notice.

§ 4. The study shall include evaluation of and make recommendations on matters including:

a. The means by which the state's coastal management program and local waterfront revitalization programs can be utilized to protect historic maritime resources;

b. The possible eligibility for one or more of the study communities, individually or collectively, to be state designated urban cultural parks;

c. The possible feasibility of all or part of the study area to be planned and managed as a heritage corridor;

d. The benefits, if any, for one or more of the study communities to initiate a local effort, in cooperation with the state urban cultural park program pursuant to section 35.13 of the parks, recreation and historic preservation law, to establish a local or regional urban cultural park;

e. The suitability of the Long Island Pine Barrens maritime reserve to advance the purposes of this study;

f. The identification of roles for other state agencies to support or assist the purposes of the study and the state's capability to support and participate in the program;

g. An estimate of local interest and commitment to the various programmatic options for recognition, preservation and development of beneficial uses of maritime related historic and cultural resources as part of historic centers on Long Island Sound; and

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h. The value and practicality of designating historic maritime communities in other regions of the state, including the Hudson river, the Saint Lawrence river, Lake Ontario, Lake Erie, Lake Champlain and the South Shore of Long Island.

§ 5. The secretary of state shall submit the study with recommendations to the governor and the legislature on or before December 31, 1995 with a preliminary report thereto on or before March 1, 1995.

§ 6. This act shall take effect immediately.

PAYMENT OF TEACHERS IN NEW YORK CITY

CHAPTER 588

A. 10245–A

Approved July 26, 1994

Effective Aug. 25, 1994

AN ACT to amend the education law, in relation to the prompt payment of salary by a board of education in a city of one million or more

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

§ 1. Section 3011 of the education law is amended by adding a new subdivision 1–a to read as follows:

1–a. Notwithstanding any other provision of law, in a city with a population of one million or more, all teachers, as that term is defined in section 13–501 of the administrative code of the city of New York, and all board of education employees serving as regular substitutes or full term per diem substitutes shall be paid the amount of compensation due them pursuant to collective bargaining agreements or to other contracts on the precise date such compensation is due. If such payments are not made on the dates so required, interest shall be recovered beginning thirty days, following the later of the effective date of this act or the required payment date through the day that payment is in fact tendered. In the case of a salary differential, the date compensation is due shall be defined as thirty days following the date an employee's application is filed by the employee with the board of education of the city of New York. Interest shall be computed at the rate set forth in paragraph one of subdivision (e) of section one thousand ninety-six of the tax law and shall be added to any compensation amounts referred to above that have not been paid when owed.

§ 2. This act shall take effect 30 days after it shall have become a law.

TOWN OF BATAVIA—ESTABLISHMENT OF DEVELOPMENT FACILITATION IMPROVEMENT DISTRICT OR BENEFITED AREA

CHAPTER 589

S. 7284–A, A. 10298–A

Approved and effective July 26, 1994

AN ACT authorizing the town of Batavia, Genesee county, to establish a development facilitation improvement district or benefited area and to appropriate, collect and expend monies in furtherance thereof

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

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Introduction

Volume 2 of the Long Island Sound Coastal Management Program contains the detailed background information upon which the findings, recommendations, and coastal policies found in volume 1 are based. Volume 2 and the "Guide to the Application of the Long Island Sound Coastal Management Program Policies" should be used to interpret the recommendations and the policies of the Long Island Sound Coastal Management Program.

COASTAL MANAGEMENT IN NEW YORK STATE

New York's Coastal Management Program is designed to be a partnership of state and local government, each bringing their perspectives and authorities to achieve a joint economic and environmental vision for the future.

The Coastal Management Program creates a framework to integrate the state's environmental and development objectives in the coastal area and to coordinate the actions of state and federal agencies to support those objectives. The state's vision for its diverse coast is expressed in a single set of comprehensive coastal policies which focus on: revitalizing urban waterfronts, protecting significant habitats and natural resources, increasing public access, and strengthening water-dependent uses. The policies contain enforceable standards, derived from appropriate state laws, and explanatory text to implement the requirements of Article 42 of the Executive Law for management of the state's coastal resources. Local governments are invited to join the state in the task of managing coastal resources by preparing Local Waterfront Revitalization Programs.

The state Coastal Management Program has guided the beneficial use and stewardship of New York's coastal resources since its approval by the Governor and the U.S. Secretary of Commerce in 1982. Its policies apply throughout the state's diverse 3,200 mile long coastline, except where local governments have voluntarily participated in the Local Waterfront Revitalization Program.

The Local Waterfront Revitalization Program (LWRP) enables the state's Coastal Management Program to address the problems of coastal development in full partnership with local government. Management of coastal development, whether the concern is protecting critical natural resources or revitalizing deteriorated waterfronts, must, of necessity, include regulation of land use. Local Waterfront Revitalization Programs result from the state's recognition that coastal resources could not be comprehensively managed without the land use control authority of local government. Over 125 local governments throughout the state are voluntarily preparing LWRPs. These LWRPs are enforced through local laws, including land use regulations.

By agreeing to participate in the management of New York's coastal resources through voluntary enforceable LWRPs, local governments gain a significant advantage—state and federal consistency. Once a LWRP is approved, it substitutes in full for the state coastal program in a municipality. The more specific coastal policies of the LWRP, not the state coastal policies, are used to determine the consistency of state and federal agency actions. Local concerns are thereby reflected in state and federal actions.

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The state Coastal Management Program represents a significant shift in the relationship of federal and state government and local government. State government has always indirectly affected local land use patterns through its capital programming, permit decisions, land acquisition programs, and other actions. As the state pursued projects, construction of a new highway, for example, its focus was creating an efficient transportation network. The focus was not on the land use consequences of its choice of route, road capacity, or location of exits. As a result, some communities and businesses withered as traffic by-passed. In other areas, new growth pressures were created.

Such changes in local land use patterns induced by state action may be contrary to local land use plans and regulations because the state action did not always incorporate consideration of the implications of its action on land use. Through requirements for consistency, the state Coastal Management Program fosters opportunities for local governments to have their concerns in the coastal area incorporated into state decision-making. The relationship of local governments to the state coastal management program, whether participating or not in the Local Waterfront Revitalization Program, is not changed by the LIS CMP. If a community has an approved LWRP, its coastal policies—not the Long Island Sound Coastal Management Program policies—will continue to set the standards for review of activities for consistency.

Where there is no approved LWRP, the policies and standards of the LIS CMP will be used to determine consistency, just as the current process uses the state coastal policies. This is the system embodied in the regulations implementing the state Coastal Management Program, which has operated for the past 12 years.

THE LONG ISLAND SOUND COASTAL MANAGEMENT PROGRAM

The Long Island Sound Coastal Management Program does not alter the land use authority and other home rule prerogatives enjoyed by local governments in New York State. Local governments continue to have sole responsibility for zoning and other land use matters, just as they do under the current coastal management program.

The Long Island Sound Coastal Management Program changes the relationship of state and local government in one important way—greater assurance that state and federal actions will reflect local priorities and coastal characteristics.

The Long Island Sound coastal policies are more specific than the state coastal policies. They were designed to address the circumstances of the Long Island Sound region and the concerns of local governments expressed in both approved and draft LWRPs. The LIS CMP policies, by virtue of their regional specificity and more clear and direct ties with state law, offer greater guidance in making consistency determinations. Since the policies of the LIS CMP also reflect the land use objectives of affected local governments, the LIS CMP can ensure that there is greater state compliance with local land use and zoning laws.

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GEOGRAPHIC SCOPE

The Long Island Sound coastal area extends from the New York/Connecticut border to Orient Point and across the waters of the Race to include Fishers Island. The westernmost extent of the LIS CMP is the Throg's Neck Bridge in New York City. The waterside boundary is the New York/Connecticut state line in Long Island Sound. The inland coastal boundary is the New York State coastal boundary, or the boundary as amended by the approved Local Waterfront Revitalization Programs of the City of Rye, Town of Mamaroneck, Village of Larchmont, Village of Mamaroneck, New York City, Town of Smithtown, Village of Nissequogue, and Village of Head-of-the-Harbor. The LIS CMP makes minor modifications of the coastal boundary to incorporate lands adjacent to the proposed Outstanding Natural Coastal Areas. These boundary extensions are shown on the maps accompanying the discussion of these special management areas in chapter 7.

For purposes of analysis, a two tier study area was used: the coastal area and an area that includes the coastal area and uplands to the topographic divide. The topographic divide line allows consideration of nonpoint source pollution factors. Detailed data on trends in land use, transportation, demographics, and economic activity were assembled for the coastal area. Information relating to water quality such as direction of runoff flow, hazardous waste sites, and land use patterns was gathered for the watershed area to assist in tailoring coastal nonpoint pollution control management measures to the condition of the Sound's watershed.

In this document, the "coastal area" means the land and water falling within the coastal boundary established by the New York State Coastal Management Program, as amended through the approval of various Local Waterfront Revitalization Programs. The "watershed" refers to the coastal area and uplands to the topographic divide (see map 1.0).

These two areas, the coastal area and the watershed area, have distinct regulatory meanings. Within the coastal area, actions must be consistent with the policies of the Long Island Sound Coastal Management Program or approved Local Waterfront Revitalization Programs. The more extensive watershed area constitutes the area within which management practices to control nonpoint pollution to coastal waters should be applied to improve water quality in Long Island Sound.

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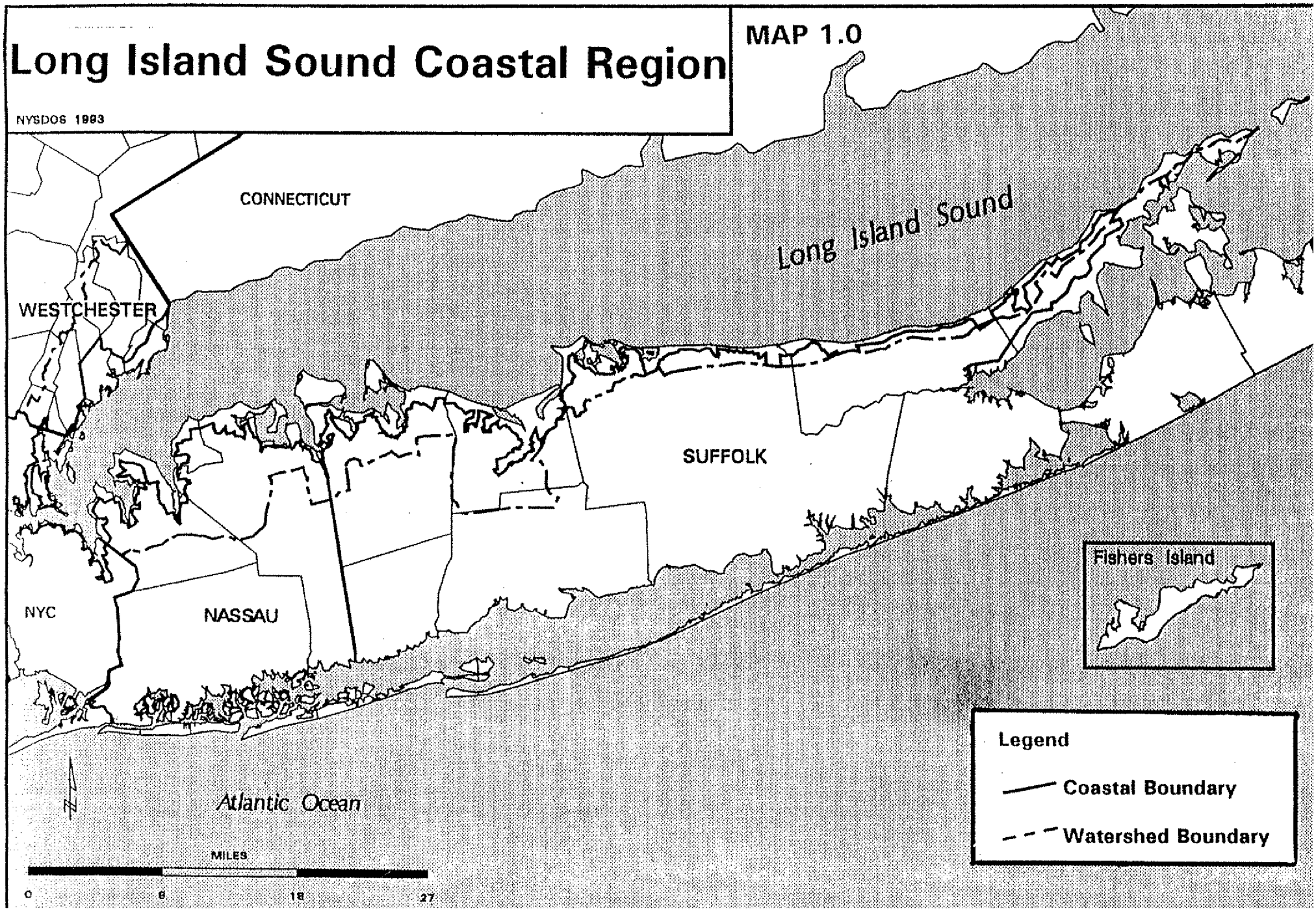
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Chapter 1

The DEVELOPED COAST

Enhance community character by improving the quality of existing development, promoting a sense of connection to the Sound, and focusing growth and investment to preserve the positive relationship between the built and natural landscapes and between existing and new development.

The Long Island Sound coastal region has a long history of development which has left a legacy of centers of industrial, commercial, and recreational activity; traditional harbors; stable residential areas of varying densities; and agriculture—all intermixed with natural areas of woodlands, fields, wetlands, bluffs, and beaches. This history has led to a sense of place that varies with the character of individual communities along the Sound coast. A sense of place results from the combination of many individual components of a community that provide the "sense" that a community is special and exhibits a distinctive identity of its own. These components are all encompassing and include the history and culture of a community; its residents; its economic and commercial base; the pattern, style, and design of existing development; open space and parkland; the physical and natural characteristics; and the functional, psychological, and visual links between these components. Even within the apparent metropolitan sprawl of Long Island, it is possible to discern individual communities with distinctive qualities and a strong sense of their own identity. These communities stand out within the region, yet are also an integral part of the functioning of the region. Too often this identity is taken for granted, and the gradual loss of the important components valued by a community leads to a loss of sense of place and a feeling of "Anywhere USA."

The Long Island Sound coastal region is essentially a developed coast with almost all land adjacent to the Sound used for some public or private purpose. Much of the community character is defined by the existing patterns and style of development, a pattern and style that over the years has exhibited a great deal of "connectedness" to Long Island Sound. The concept of "connectedness" is important to the understanding of sense of place and community character. "Connectedness" can be described in terms of three components: "the sense of kinship with all life; the sense of partnership with working landscapes; and the sense of community and companionability that is traditionally fostered by villages and urban neighborhoods" (Hiss 1990, p. 126). This "connectedness" is threatened by new development and redevelopment.

Three different types of development trends exist within the coastal area of the Sound:

- modest infill development in stable, almost fully developed areas of the coast in the western portion of the region
- redevelopment of significantly sized deteriorated, abandoned, and underutilized areas in urban or previously developed areas of the Sound coast
- major new development in previously undeveloped areas located in eastern Long Island

These development trends need not impair the community character of the Long Island Sound coastal region or the sense of place of the individual communities that come together to form the region's identity. However, to ensure that change maintains or enhances community

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character and "connectedness," the impacts of new development, redevelopment, and, indeed, existing development must be managed to meet the demands of environmental improvements and liveable communities. This can lead to the coexistence of successful built-up urban areas and the surrounding natural and working landscapes in an area that respects the natural and economic values of the Long Island Sound. As Tony Hiss points out, "if we're having to learn ... that no place is automatically immune from development pressures these days, we're also finding out that no place need ever be inevitably overwhelmed by development" (Hiss 1990, p. 162).

DEVELOPMENT PATTERNS

The shoreline of the Sound has been inhabited for the last 10,000 years. The first human settlers were aboriginal nomadic hunter/gatherers, who gradually switched from a subsistence economy to a horticultural system based around semi-permanent and permanent settlements. These early settlements were in the prime shoreline locations that were attractive to the first European settlers and became the focus of initial contact between Native Americans and Europeans. Cultural conflict and competition for control of natural resources led to the swift destruction of the native presence, which was all but removed by 1645.

Coastal areas were especially attractive to the early colonists because of the highly productive wetlands and fertile uplands. During Colonial times and throughout much of the region's early modern history, the Sound coast supported an agrarian economy, serving local needs and producing food for sale and shipment to the growing metropolitan area of New York City. The initial settlement pattern and roads were laid out during this period. During the eighteenth and nineteenth centuries the economy of the region diversified. The wood products industry became one of the most important in the state, whaling and fishing industries flourished, and with increased waterborne transportation, several communities became maritime centers supporting a thriving shipbuilding industry.

Changing technology, more intensive agricultural operations, and increased competition from other parts of the state led to changes in the land use patterns and economy of the region. Market gardening and poultry farming replaced field crops, while whaling declined. Improved transportation links, based around the development of the railroads, established the Sound coast as an ideal place for recreational escape from the increasingly crowded metropolitan area. These resort communities gradually became year-round settlements and large residential estates were developed. Close to the heart of American finance, accessible by boat, railroad, and later, by automobile, and blessed with a mild climate and pleasant topography, Long Island Sound supported hundreds of estates. The estate era had a lasting effect on the development and land use patterns of the Sound shoreline, particularly in the immediate suburban areas of Westchester and Nassau counties, reshaping the agricultural landscape and dominating the shoreline, excluding the general public from both uplands and shore.

The introduction of the automobile greatly affected the growth of the region, aiding the development of estates and eventually enabling the middle and working classes to gain access to summer vacation resorts and public recreational areas. Many stayed to make their homes in the newly created subdivisions, which were being carved from the great estates, or in the coastal communities located on the Sound. The developing system of roadways also provided an alternative to waterborne and rail transport and soon proved to be a powerful attraction for commercial development.

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During the early and mid-twentieth century, the region saw a major period of infrastructure and recreational development that was to set the framework for future growth and land use patterns within the region. A complex network of public works, including major transportation routes and state parks, was developed that facilitated the growth of suburban areas. In more remote areas, the tourist and resort developments were providing the stimulus for construction of new transportation, energy, and communication infrastructure. This period saw the rapid expansion of the influence of New York City, with the first ring of suburban development opened up by rapid transit systems, railroads, and highways. Commercial and industrial development soon followed and the land use pattern began to take on the structure that is seen today.

The major period of population growth and land development came in the years immediately after the Second World War. The pent-up housing demand, personal savings during the war, automobiles and improved road networks, the G.I. Bill, FHA mortgages, and the perception of an enhanced quality of life to be found in the suburbs led to rapid growth. The population of Westchester County grew from 573,558 in 1940 to 808,891 in 1960 and the population of Nassau County grew from 406,748 to 1,300,171 over the same period. Suffolk County, lagging slightly behind Nassau County in the onset of its population explosion, increased from 276,129 in 1950 to 1,127,030 in 1970. This population growth was closely followed by a substantial expansion of commercial and industrial development, primarily associated with the major highway corridors. The counties surrounding New York City became employment centers in their own right, fueling home-grown demand for commercial and residential development. The basic infrastructure that supported the population growth and the economic expansion of the region is shown on map 2.0.

Today, the Long Island Sound is part of the most densely populated region of the United States. The watershed of the Sound includes parts of six states and Canada and contains in excess of 8.5 million people (1980). New York State comprises only 2.5 percent of the total watershed area, yet contributes about 1 million people. An additional 9 million people live near the Sound, in the metropolitan area of New York City or on Long Island. Population growth in the general vicinity of the Sound was phenomenal between 1940-80, at 78 percent. Since then the growth rate has been only 1 percent and this low growth rate is expected to continue for the next decade. Even though there is a slow growth period, population structure is changing through an aging population, local migration patterns, and reductions in household size. These factors contribute to a slow, but steady development pressure, with new development and redevelopment continuing along the shoreline and within and adjacent to the watershed area. This pressure compounds the negative impacts of existing development and threatens the quality of the Sound, which has become a highly stressed natural resource.

Most existing development has a positive role in determining a community's sense of place, however, existing development often has a negative impact on the surrounding natural environment. Outdated infrastructure, overtaxed sewerage systems, and the polluting legacy of old industrial uses are all examples of the negative impacts of existing development. Wastewater treatment plants operating along the shore have been cited as a major source of pollution contributing excessive amounts of nitrogen to the Sound. Nonpoint sources of pollution contribute to nutrient loadings in the Sound. High levels of nitrogen have been linked to reduced oxygen levels, which have impacted the Sound's fishery. Many of the original natural habitats of the Sound and the surrounding uplands have been destroyed or severely stressed by impacts from adjacent development.

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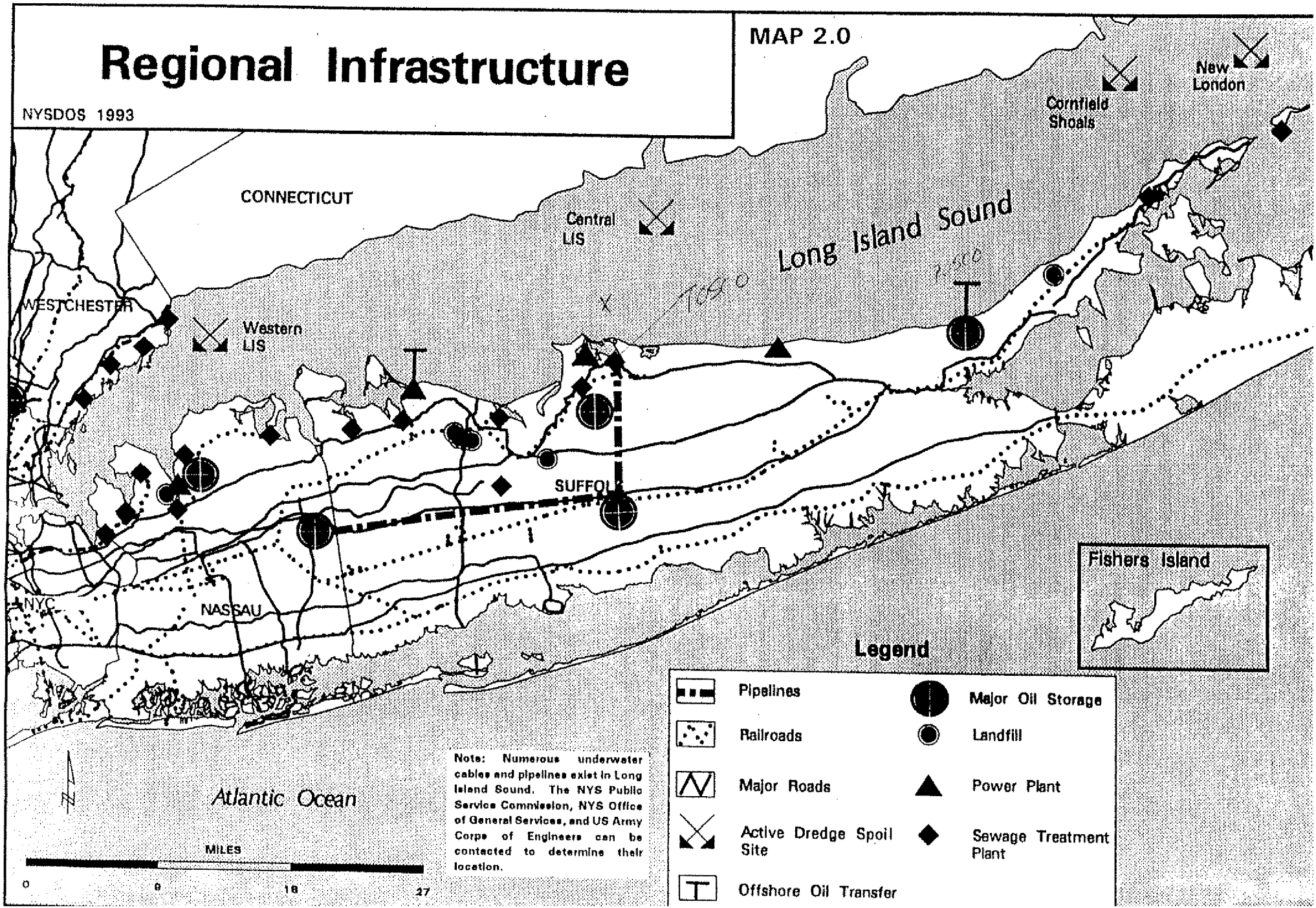
Regional Infrastructure

NYSDOS 1993

MAP 2.0



Note: Numerous underwater cables and pipelines exist in Long Island Sound. The NYS Public Service Commission, NYS Office of General Services, and US Army Corps of Engineers can be contacted to determine their location.

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As development and redevelopment continue, existing infrastructure is near or has exceeded its capacity. Indeed in many places growth has outpaced improvements to infrastructure capacity, particularly with regard to sewage treatment capacity and the highway network. Congestion, diminished community character, and negative environmental impacts, notably declining water quality, result from this pressure on the region's infrastructure.

Few traditional industrial water-dependent facilities survive along the region's waterfront. Former industrial sites are typically deteriorated and no longer commercially viable. Transportation systems have been especially hard-pressed to keep up with the pace of development and are increasingly prone to congestion and gridlock. The economic downturn that began in the late 1980's continues to have a negative impact on economic conditions in the region. All these impacts are increasingly threatening the community character and sense of place of the Long Island Sound coastal area.

In addition, community character and sense of place are constantly under pressure from new development, as changes in population structure, technological advances, and shifts in economic activity necessitate and provide opportunities for reuse of waterfront lands. While new development is often compatible with the existing character of a community and has minimal impact on the surrounding natural environment, some new development not only negatively impacts community character, but places demands on existing infrastructure and impairs the natural resources of the Sound coast, notably by reducing open areas, altering the natural ecosystem, and impairing water quality.

RECENT TRENDS

DEMOGRAPHICS

Population within the Long Island Sound region has been relatively stable for the past twenty years. At the same time, average household size has been decreasing and total housing units increasing, leading to continued growth in development. Another noticeable trend is the rising median age of the population. These trends are expected to continue over the next twenty years, with the population expected to grow by 1.5 to 2 percent.

Table 1 summarizes the distribution of population for the Long Island Sound coastal area and the larger watershed area (see Introduction, Geographic Scope, for description of the study areas). The estimated 1990 population within the watershed area is 1,409,590 persons, which includes 195,686 persons in the coastal area.

Table 1 Estimated 1990 Population

	COASTAL AREA	WATERSHED
Westchester County	56,960	271,953
New York City	53,428	744,072
Nassau County	33,716	177,362
Suffolk County	51,582	216,203
TOTAL	195,686	1,409,590

Population and housing change within the coastal area and watershed area of each county and New York City are outlined in table 2. New York City showed the greatest fluctuations in population, with the growth in coastal area population attributable to the completion of Co-op City. Nassau County has experienced a decline in population, while population in Suffolk County has increased. This may be the result, in part, of an eastward drift of population through locational shifts in existing population.

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Table 2 Population and Housing in Long Island Sound Coastal Region, 1970-1990

	YEAR	POPULATION	HOUSING UNITS		HOUSEHOLD SIZE
			TOTAL	OCCUPIED	
Westchester County					
Coastal Area	1990	56,960	22,289	21,420	2.66
	1980	58,645	--	--	--
	Change 80-90	-1,685	--	--	--
Watershed	1990	271,953	104,018	99,792	2.73
	1980	276,031	--	--	--
	Change 80-90	-4,078	--	--	--
New York City					
Coastal Area	1990	53,428	23,080	22,418	2.38
	1970	34,265	--	--	--
	Change 70-90	19,163	--	--	--
Watershed	1990	744,072	321,860	309,671	2.4
	1970	774,106	--	--	--
	Change 70-90	-30,034	--	--	--
Nassau County					
Coastal Area	1990	33,716	12,375	11,717	2.79
	1970	34,871	10,765	10,172	3.33
	Change 70-90	- 1,155	1,610	1,545	- 0.54
Watershed	1990	177,362	65,862	62,779	2.73
	1970	185,912	57,608	55,608	3.27
	Change 70-90	- 8,550	8,557	7,171	- 0.54
Suffolk County					
Coastal Area	1990	51,582	19,880	17,308	2.84
	1970	48,498	14,367	12,336	3.41
	Change 70-90	3,083	5,513	4,972	- 0.57
Watershed	1990	216,203	77,134	71,060	2.92
	1970	198,841	56,298	51,216	3.64
	Change 70-90	17,362	20,836	19,844	- 0.72

Source: Long Island Regional Planning Board, 1993. Westchester County Planning Department, 1993. U.S. Census, 1970, 1990

Population density within the watersheds of Nassau and Suffolk counties is about 2.5 persons per acre. The coastal area has a density of 1.5 persons per acre and the area of the watershed outside the coastal boundary has a density of 3.1 persons per acre. Population density increased only slightly in the period between 1970 and 1990. Population density is higher in the New York City and Westchester County coastal areas, as well as throughout the metropolitan region.

Although the total population has been relatively stable in the coastal and watershed areas, there has been a relatively large increase in the number of housing units. In 1990, the watersheds of Nassau and Suffolk counties contained 142,996 housing units, an increase of 29,393 housing units since 1970. This disparity can be linked to the continuing decline in household size. In 1970, household size ranged from 3.10 to 3.64 persons per household. By 1990, household size ranged from 2.38 to 2.92 persons per household.

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The median household income in 1989 ranged from $21,944 in Bronx County to $150,000+ in parts of Long Island. Housing values within the coastal area are among the highest in the state. The 1989 median housing value ranged from $131,200 to $500,000+.

Population and Housing Projections

The Long Island Regional Planning Board (1993) provided population and housing projections for the coastal area and the watershed area within Nassau and Suffolk counties. Table 3 shows the estimated ranges for population and housing units for the coastal and watershed areas for the years 2000 and 2010 and at saturation. These projections are based on existing population and housing units estimates and projected household size and housing units under different assumptions. Future housing units under a "saturation" scenario were estimated by computing housing unit yields under existing zoning for vacant land currently zoned for residential uses and for land occupied by nonconforming uses.

From 1990 to 2000, the population of the coastal area could stay the same or increase as much as 9,700 persons, while the change in population of the watershed area outside the coastal boundary could range from a decrease of 15,000 people to an increase of 4,000 people. From 1990 to 2010, the population of the coastal area could increase by between 3,200 to 12,600 people, while the population change in the watershed area outside the coastal boundary could range from a decrease of 9,400 people to an increase of 9,700 people. These ranges depend on assumptions that are applied to household size, group quarters growth, and occupancy rate of seasonal homes and existing and projected housing units. Under saturation development and occupancy, population could increase by almost 59,000. The coastal area could be expected to grow by 24,500 and the watershed outside the coastal boundary by 34,500.

An unpublished study by the Long Island Regional Planning Board estimates an approximately 1.17 percent growth in the number of housing units for Nassau and Suffolk counties from 1990 to 2000. The projected growth rates for the coastal and watershed areas are higher than this regional estimate, reflecting the more desirable nature of land located on or adjacent to the Sound. Housing unit estimates for the coastal area project increases of 3 percent to 4.09 percent between 1990 and 2000, and 6.13 percent to 7.15 percent between 1990 and 2010. Housing unit estimates for the watershed area outside the coastal boundary project increases of 1.79 percent to 2.39 percent between 1990 and 2000, and 3.58 percent to 4.18 percent between 1990 and 2010.

In 1990, there were 32,255 housing units within the coastal area. An additional 6,590 units could be built, if all available developable and redevelopable land is developed to its zoned residential capacity. The watershed area outside the coastal boundary had 110,741 existing housing units in 1990 with a possible addition of 13,218 units. At capacity, based upon existing ordinances, the entire watershed area would contain 162,804 housing units, adding 19,808 units after 1990. This represents a 14 percent increase in housing units.

Breaking these projections down to a more local level illustrates the possible distribution of residential growth, assuming all available developable and redevelopable land is developed to its zoned residential capacity. Western Nassau County could see a 6 percent increase in housing units, eastern Nassau County a 10 percent increase, western Suffolk County an 11 percent increase, the towns of Brookhaven and Riverhead a 24 percent increase, and the Town of Southold a 110 percent increase. Generally, twice as many housing units could be built in the area of the watershed outside the coastal boundary than within the coastal area.

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Table 3 Saturation Population and Housing Estimates, Nassau and Suffolk Counties

	COASTAL AREA	WATERSHED	METHODOLOGY
1990			
Total Housing Units	32,255	142,996	1990 Census of Population and Housing
Population in Households	81,787	378,603	1990 Census of Population and Housing
Population in Group Quarters	3,511	14,962	1990 Census of Population and Housing
Total Population	85,298	393,565	1990 Census of Population and Housing
2000			
Estimated Housing Units	33,224	145,968	(B) Existing 1990 dwelling units plus 15% of possible units 1990-2000
Estimated Population	87,843	401,724	(B1) Estimated population at 1990 occupancy rate and 1990 household size plus 105% of 1990 group quarters population.
Estimated Population	85,304	390,124	(B2) Estimated population at 1990 occupancy rate and saturation household size plus 105% of 1990 group quarters population.
Estimated Population	94,129	415,745	(B3) Estimated population and full occupancy and saturation household size plus 105% of 1990 group quarters population.
Estimated Housing Units	33,573	146,958	(D) Existing 1990 dwelling units plus 20% Of possible units 1990-2000
Estimated Population	88,632	404,194	(D1) Estimated population at 1990 occupancy rate and 1990 household size plus 105% of 1990 group quarters population.
Estimated Population	86,070	392,521	(D2) Estimated population at 1990 occupancy rate and saturation household size plus 105% of 1990 group quarters population.
Estimated Population	95,020	418,445	(D3) Estimated population and full occupancy and saturation household size plus 105% of 1990 group quarters population.

2010			
Estimated Housing Units	34,232	148,938	(C) Estimated dwelling units in 2000 plus 15% of possible units 2000-2010
Estimated Population	90,387	409,884	(C1) Estimated population at 1990 occupancy rate and 1990 household size plus 110% of 1990 group quarters population.
Estimated Population	87,777	398,062	(C2) Estimated population at 1990 occupancy rate and saturation household size plus 110% of 1990 group quarters population.
Estimated Population	96,977	424,593	(C3) Estimated population and full occupancy and saturation household size plus 110% of 1990 group quarters population.
Estimated Housing Units	34,562	149,929	(E) Estimated dwelling units in 2000 plus 15% of possible units 2000-2010
Estimated Population	91,177	412,355	(E1) Estimated population at 1990 occupancy rate and 1990 household size plus 110% of 1990 group quarters population.
Estimated Population	88,543	400,459	(E2) Estimated population at 1990 occupancy rate and saturation household size plus 110% of 1990 group quarters population.
Estimated Population	97,868	427,293	(E3) Estimated population and full occupancy and saturation household size plus 110% of 1990 group quarters population.
SATURATION POPULATION			
Estimated Housing Units	38,845	162,804	all units built
Population in Households	105,588	445,936	0.085% decline in household size
Population in Group Quarters	4,213	17,954	20% increase in group quarters
Total Population	109,801	463,890	100% occupancy

Source: Long Island Regional Planning Board (1993)

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Land zoned for residential uses would yield 86 percent of the possible, future dwelling units. The remaining 14 percent of units would be built on land with a primary zoning category that allows residential development within that zoning category. Agriculturally zoned land in the towns of Riverhead and Southold would account for 10 percent of the additional dwelling units, while commercial, industrial, and recreational zoning in the same towns would account for the remaining 4 percent of future units.

Table 4 shows the number of residentially zoned acres available for development or redevelopment by current land use within the watershed area. Of the total 24,135 acres available, 46 percent is vacant. One-third of the residentially zoned vacant acreage lies within Nassau County, particularly in the Town of Oyster Bay. The redevelopment of lands presently used for private recreation, especially golf courses, accounts for 20 percent of the land available for development and is the second largest current land use category. These private golf courses are predominantly in the western portion of the Sound coastal region, principally in the estate areas of Nassau County. Agricultural use accounts for 11 percent of potential residential development. The bulk of this property is located in Riverhead and Southold.

Table 4 Residentially Zoned Land Available for Development or Redevelopment, Nassau and Suffolk Counties in Study Area

CURRENT LAND USE	TOTAL ACREAGE
Agriculture	2,608
Commercial	226
Industrial	38
Large Estates	547
Other	2,276
Private Recreation	4,862
Sand Mining	437
Vacant	11,122
Wetlands	2,019
Total	24,135

Source: Long Island Regional Planning Board, 1993

The 9 percent of lands in the "other" category includes mostly institutional properties which are zoned residential. Almost half of this acreage is attributed to the Kings Park Psychiatric Center in the Town of Smithtown. This property is residentially zoned, but will be redeveloped according to a master plan which may reuse existing buildings on the property.

Just over 10,500 acres, almost 44 percent, of the residentially zoned, developable or redevelopable land are within the coastal area. Within this acreage, 44 percent is currently vacant, 10 percent is in private recreational use, 15 percent is institutional, and 5 percent is agricultural. Just over 13,500 acres of residentially zoned, developable or redevelopable land lie in the watershed area outside the coastal boundary. Within this acreage, 48 percent is currently vacant, 28 percent is in private recreational use, 15 percent is agricultural, and 5 percent is in the other category.

As the Long Island Sound coastal region moves toward saturation development, there will be increased pressure on the region's infrastructure, natural resources, open space, and community character. If current trends continue, the pattern of suburbanization and dispersed growth so familiar in the region will continue eastward into Suffolk County, while areas to the west will see development of the few remaining open areas and an increase in the density of development. At the same time as new development is taking place on undeveloped parcels, areas of previously developed land are being left behind to remain vacant and underutilized, victims of changing economic circumstances and locational preferences.

As development continues under current zoning, communities will be required to make hard choices. If a community waits until capacity is reached to make these choices, then its land

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area will already be built out to its fullest extent, leaving few choices for the future other than deciding where to increase the density of development. At this stage it is likely that a community's sense of place and "connectedness," particularly to Long Island Sound, will be greatly diminished. Another choice remains for the region, a choice which involves communities' examining the current impacts, patterns, and trends of development and deciding to make changes to better guide future growth before development capacity under current zoning is reached. This choice will undoubtedly provide the region with a wider set of options for the future. The next sections begin this process by examining the current land use and community character of the Long Island Sound coastal region and providing recommendations for the developed coast.

LAND USE AND COMMUNITY CHARACTER

Table 5 shows estimates of land area by county in the coastal and watershed areas. Current land use along the shoreline consists of a mix of three major categories: residential use, comprising about 70-80 percent of the shoreline; recreational use and dedicated open space, comprising about 10-20 percent of the shoreline; and commercial/industrial uses, comprising about 5-10 percent of the shoreline. Vacant lands comprise about 5 percent of the shoreline.

Consistent and detailed data on land use changes within the coastal and watershed areas are extremely limited. Two comprehensive surveys were carried out in 1966 and 1981 for Nassau and Suffolk counties; however, variations in classifications, boundary changes, and differing map bases diminish the value of the comparison. General trends apparent from these surveys showed a reduction in agricultural and vacant land and increases in most other land uses. Nassau County, in spite of a growth in housing units, showed only a small increase in residential land, while Suffolk County added 15,000 acres. Similarly, Nassau County showed a stable pattern of commercial and industrial land, while Suffolk County almost doubled the acreage in these uses.

Table 5 Land Area Estimates by County

	COASTAL AREA (acres)	WATERSHED (acres)
Westchester County	8,768	67,700
Bronx County	3,277	10,335
Queens County	1,161	10,730
Nassau County	12,990	56,230
North Hempstead	6,680	20,980
Oyster Bay	6,310	35,250
Suffolk County	43,750	100,160
Huntington	12,470	26,730
Smithtown	8,920	30,680
Brookhaven	7,390	19,190
Riverhead	4,790	9,380
Southold	10,180	14,180

Source: Long Island Regional Planning Board, 1993
Westchester County Planning, 1993

There has been only minimal examination of changes in land use between 1981 and the present. The general trend appears to be for only minor changes in land use in the built-up sections of Westchester County, New York City, Nassau County, and western Suffolk County, with change often requiring redevelopment of previously developed land and often resulting in a change of use from institutional, commercial, and industrial uses to residential use. The most active changes in land use can be seen in eastern Suffolk County, where areas of agricultural and vacant land are declining, and areas of residential, commercial, and industrial land are increasing. Despite the slow growth in population, the largest changes are generally in residential land use. Local migration and new household formations continue

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to provide a demand for new housing opportunities throughout the Long Island Sound coastal region.

The densest development occurs in New York City and the immediately adjacent areas of Westchester and Nassau counties. These areas feature intense commercial uses, which dominate major arterials and central business districts. Generally, the highest densities of residential development are to be found inland. The majority of the western and central part of the Sound shoreline features lower density residential and open space uses, although there are some areas of denser development on the shoreline of western Suffolk County. Throughout the central and western sections of the area, there are large tracts of private recreation open space in the form of golf and country clubs. These are located mainly in the watershed area of the Sound outside the coastal boundary. The western part of Suffolk County features several large state and county parks, institutional properties, and utility tracts. The eastern parts of Suffolk County consist of mostly low density residential and agricultural uses, with a few large parks and one major oil storage facility. Less than 3 percent of the western part of the Long Island Sound coastal area is vacant land. The percentage of vacant land increases eastward, with 9 percent in western Suffolk County, 6 percent in central areas of Suffolk County, 10 percent in eastern Suffolk County, and 25 percent on Fishers Island.

The Nassau and Suffolk counties' watershed area encompasses approximately 156,390 acres, about 20 percent of the total land area of Long Island. Its land use patterns have been examined in more detail than the Westchester County and New York City sections of the Sound coastal region. A detailed analysis of current land use was carried out by the Long Island Regional Planning Board (1993). Twelve land use categories were mapped, including residential, commercial, commercial-recreation, industrial, institutional, open space and recreational, agricultural, transportation and utilities, and vacant. Previously developed land use maps were used as the primary information source and were updated by interpretation of the most recent aerial photographs available. The regional scope of this analysis precluded a parcel-by-parcel determination of land use. Hence, the boundaries of the different land use categories were generalized, with uses designated denoting the predominant use occurrence.

The Long Island Regional Planning Board used this survey to prepare estimates of the area of land available for development or redevelopment by existing land use and current zoning. This was accompanied by estimates of the possible yield of residential units, if these areas were to be fully developed under current zoning regulations. Wetland areas were assumed to be unavailable for development. The vacant land classification included undeveloped land with no identifiable current use and represented developable parcels; for instance, an old farm field or wood lot within a subdivision would be classified as vacant. Land that is derelict or abandoned and represented redevelopable parcels was classified under its previous use; for instance, the former gravel pits in Port Washington are classified as sand mining, and derelict industrial sites are classified as industrial.

Outlined in the next section is an examination of the land use and community character of the Long Island Sound coastal region. This includes a county overview and a more detailed examination of the character of the individual municipalities. The components of community character include the natural environment, land use patterns, and scenic and cultural resources. The detailed land use analysis carried out by the Long Island Regional Planning Board is incorporated in the analysis of Nassau and Suffolk counties.

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WESTCHESTER COUNTY

Westchester County occupies 44 miles of Long Island Sound shoreline between New York City and Connecticut. The county's shoreline is deeply indented and irregular, with numerous bays, inlets, and islands, all featuring rock outcroppings, small beaches, wetlands, and intertidal mudflats. The importance of several major wetland habitats along the Sound has been recognized by their designation by the state as Significant Coastal Fish and Wildlife Habitats. Much of the coastal watershed consists of low hills, with mature vegetation—trees, shrubs, lawns, and gardens—characteristic of established suburban areas in the northeast. The streams draining the coastal watershed are relatively small, with wide drainage basins in proportion to the length of the streams.

The Westchester County watershed of Long Island Sound is almost completely developed. The land uses of the watershed and coastal area are summarized in table 6. The main centers are located in New Rochelle, Larchmont, Mamaroneck, Rye, and Port Chester. Residential use predominates throughout the watershed, with some of the highest density residential development in New Rochelle and Port Chester. Less than 5 percent of the land is vacant, mostly consisting of golf courses and parks. The county features a number of central business districts and intermittent commercial strip developments which are located away from the Sound, focused on NY Route 1. The central business districts tend to contain a mix of commercial, industrial, and residential uses. In common with many mature suburbs, most coastal communities are losing population at the same time that their populations are aging. These trends are reflected in reductions in household size.

The shoreline and coastal area is dominated by a band of older, fully developed suburbs. Development density along the shoreline fluctuates, with the highest densities to the east and west, and the lowest densities in the central part of the shoreline. The shoreline is primarily residential with commercial and industrial development generally located inland. Other shoreline uses include county and local parks, public and commercial marinas, private country and beach clubs, and the occasional industrial parcel. Traditional water-dependent commercial activity has been steadily declining, with many deteriorated and underutilized sites located primarily in New Rochelle and Port Chester. Water-dependent uses now mainly

Table 6 Land Use, Westchester County

	COASTAL AREA (acres)	WATERSHED (acres)
Commercial/Retail	125.16	781.09
Institutional, Public Assembly	257.64	3183.52
Interior Water Bodies	173.48	399.65
Manufacturing, Industrial, Warehouse	150.39	550.24
Mixed, Residential/Non-Residential	364.42	897.11
Office	20.69	1473.28
Open Space-Active	1763.51	5623.51
Open Space-Passive	328.80	1156.36
Residential-High Density	286.98	917.64
Residential-Medium Density	3461.20	16463.51
Residential-Low Density	1467.66	5487.81
Transportation, Communications, Utilities	351.79	2345.02
Undeveloped	165.35	1874.85

Source: Westchester County Planning, 1993

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serve the needs of the recreational boating industry. Both the county and coastal municipalities have waterfront parks, conservation areas, and formally designated open spaces with many facilities for public access and recreation, mostly for residents only.

While most of the Westchester County shoreline of Long Island Sound is developed, the interface of land and water in many areas provides a range of natural and man-made scenic attractions. Harbors, wharves, boats, and associated shoreline buildings are attractive because of the types of uses, activities, and movements which take place in such areas. The shoreline has a number of well-defined harbors and coves with rock and sand beaches. The varied types of shoreline vegetation are important scenic attributes of the coast. These are ever-changing over the course of the year. The presence of islands is a characteristic element of views of the Sound, adding diversity and interest. Five Islands Park in New Rochelle offers superb views of coastal islands, as do views from Marshlands Conservancy, which also include wetlands and the far shore of Milton Harbor. The interface of land and water is outstanding in the vicinity of Larchmont Manor Park in the Village of Larchmont. From some shorelines, such as Playland Park, there are exceptional views across the Sound to Long Island.

The highly developed nature of the communities, all with established central business districts, means that there is little opportunity for future growth along the shoreline and in the immediate coastal area. Changes will be limited to redevelopment of built or vacant sites within the developed areas. Major areas with potential for redevelopment are located in New Rochelle and Port Chester.

The land use and community character of Westchester County's coastal communities are considered below.

Village of Port Chester

Port Chester was, until recently, one of the county's main industrial centers. In contrast with neighboring coastal communities, it exhibits many characteristics common to older industrial communities: dense, mixed use development; multiple dwelling units; a concentration of low to moderate income persons; and a relatively high proportion of elderly and minority persons. Single family housing makes up less than 25 percent of the dwelling units. The village's 1990 population of 24,728 represents an almost 5 percent increase over 1980.

The village's 100-acre coastal area reflects the legacy of early industrial development along a two mile stretch of the Byram River. The variety of industries that once relied on the waterfront for transportation, power, and storage declined gradually after World War II. Most of these sites are abandoned, deteriorated, or underutilized. Water-dependent uses along the river are now very limited, including only an asphalt plant, a coal company, and oil transshipment, which use the river for transporting materials, three marinas, and two yacht clubs. Other waterfront area uses consist of houses, parks, and public facilities, such as village storage yards or parking lots. Over 25 percent of the coastal area consists of an attractive, stable neighborhood.

Waterfront land is generally put to some use, although mostly for economically marginal purposes or for uses locating there because the land was industrially zoned or cheap. Many structures, including houses, warehouses, and industrial buildings, are old and deteriorated. Mixed uses in many neighborhoods often result in incompatible, unsightly, and possibly unsafe circumstances, where junkyards and automotive service stations are located next to residences.

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Redevelopment opportunities in Port Chester are concentrated in the underutilized waterfront and the nearby central business district. Just over half of the land within the city's coastal boundary, largely comprised of deteriorated or underutilized areas, is included within three separate urban renewal or redevelopment areas. The village intends to make better use of this area with marinas, public access, residential, office, and retail uses.

City of Rye

The predominant land use is residential of which single family homes constitute about 70 percent. In common with many older suburbs, its generally affluent population of 14,936 declined slightly from 1980 to 1990.

Low and medium density residential uses occupy a majority of the waterfront followed by considerable amounts of park, recreation, conservation, and open space uses. The popularity of recreational boating makes water-dependent uses an important component of the city's economy. In particular, Milton Harbor plays an important economic role in the city because of the high degree of activity centered around the marina, boat yard, private yacht clubs, and private beaches. There are several public and private beaches in other waterfront areas. Playland Park, a county-owned 143-acre waterfront recreational facility, has an amusement park, beach, and fishing pier, among other facilities provided. It is one of only three waterfront parks along the county shoreline open to the general public. The only deteriorated area along the city's waterfront consists of Playland Pier, slated for rehabilitation.

Village of Mamaroneck

This residential village has mostly single family homes. Its 1990 population of 17,325 declined slightly from 1980.

Just over 75 percent of the village's nine-mile long waterfront is occupied by high value residences, at medium and low densities. Public parkland, private clubs, and commercial boat yards make up the remainder of the land uses. Recreational boating and its associated water-dependent businesses, consisting mostly of marinas, yacht clubs, and a boat yard, are focused in Mamaroneck Harbor, which is well-recognized as an important recreational port and a source of significant economic activity for the village.

Located on the harbor is Harbor Island Park, a 44-acre public park with no residency restrictions that contains a beach, municipal docks and fishing floats, playgrounds, and facilities for court games and field sports.

Town of Mamaroneck

This five square mile town, excluding the incorporated Village of Larchmont, is a residential community with about one mile of Sound shoreline. There is no industry, but there are commercial establishments serving area residents. The 1990 population of 11,231 declined slightly from 1980.

Most of the town's shoreline is privately owned, consisting largely of expensive homes in low density settings. Public waterfront lands include two conservation areas totaling 15 acres that are open to the public for passive recreation. Inland, but within the coastal boundary which encompasses the entire town, are about 577 acres of open space consisting of parks and conservation areas, three large private golf courses, and a small amount of private undeveloped land.

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Village of Larchmont

This village, with about eight miles of Sound shoreline, has its entire one square mile area included within the coastal area. It is a residential community, but there are some commercial establishments serving area residents. The 1990 population of 6,181 declined slightly from 1980.

The village's shoreline is mostly in private ownership with expensive homes in low density settings and private yacht clubs and associations. Remaining waterfront uses include public and private parks, the latter consisting of Larchmont Manor Park, a very scenic park winding along a half mile of indented shoreline that is open to the public for passive recreation purposes.

City of New Rochelle

This large suburban city is both a residential and business center along the Sound. Almost two-thirds of the dwelling units are multi-family. Its 1990 population of 67,265 represents a five percent decline since 1980.

The city's 9.3-mile long diverse and irregular shoreline has many offshore islands, Davids Island being the largest. While much of the shoreline is privately owned, there are several large and small city-owned parks plus a large county recreational facility. There are numerous beach and yacht clubs, marinas, and many residential areas with expensive homes. Portions of the waterfront were formerly occupied by industrial and commercial uses, such as a cement plant, oil storage tanks, and a boat yard.

New Rochelle features much public and privately owned waterfront land that is vacant, underutilized, deteriorated, or occupied by inappropriate uses. A number of these have potential for redevelopment. These include the Main-Echo Urban Renewal Area, where a mix of residential, commercial, and water-related recreational uses could blend in with the existing mixed use developments; Davenport Neck, where the future of the recreational beach clubs is in doubt; Davids Island; and Wrights Island Marina.

Village of Pelham Manor

The small portion of the village within the coastal boundary consists of a village waterfront park and waterfront lands owned by a private club.

New York City

The portion of New York City within the Long Island Sound coastal region occupies 25 miles of shoreline between the boundaries of Westchester and Nassau counties and includes parts of the Bronx and Queens. This shoreline has a concentration of natural features with significant recreational, scenic, and habitat values, including tidal wetlands, estuarine rivers, inlets, coves, bays, and lagoons. The importance of the shoreline's natural habitat is reflected in the designation of four areas by the state as Significant Coastal Fish and Wildlife Habitats.

The Bronx County shoreline and coastal area is a mix of residential development, park uses, and major transportation corridors. Pelham Bay Park, New York City's largest park, is located in the north of the Bronx. Although Pelham Bay Park has highly developed public access and recreation facilities, more than half of the park is natural forest, meadow, and marshland. Swimming, fishing, boating, picnicking, and field sports are available, as well as passive recreational pursuits. Residential development ranges from the high density Co-op

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City complex to low and medium density neighborhoods. The population of the Community Board 10 area declined about 8 percent between 1980 and 1990, from 106,516 to 97,863.

Water-dependent uses in the Bronx focus on recreation boating. Marinas and private yacht clubs are significant shoreline uses, particularly on City Island. City Island is an important visitor destination in the summer, with its maritime atmosphere, boats available for sport fishing excursions, and seafood restaurants. Hart Island, located east of City Island, remains the city's potter's field.

The Queens County shoreline and coastal area is a mix of residential development, major transportation corridors, and parks. More suburban in character than other parts of the city, the waterfront residential districts consist mostly of one or two family houses, with some clusters of high-rise residences in Bayside. A population decline of about 2.5 percent, from 110,963 in 1980 to 108,056 in 1990, occurred in the Community Board 11 area.

With no waterfront industrial or commercial uses and only two private yacht clubs, the remainder of the waterfront, aside from residential uses, consists of park, conservation, transportation, and military uses. The 147 acres of Fort Totten remain a military reservation with no general public access. The Cross Island Parkway straddles the west shore of Little Neck Bay, separated from the water by a narrow green strip of parkland with a pedestrian and bicycle path. Both active and passive recreation, as well as natural areas, are included in Alley Pond Park, one of the city's largest parks, located at the southern end of the bay. Udalls Cove and Ravine, to the east at the Nassau County boundary, is managed by the city as a wildlife preserve with passive recreation available.

The variety of natural and man-made landscapes along New York City's portion of Long Island Sound provides many scenic attractions. The shoreline is irregular, with coves, inlets, bays, islands, and rocky outcroppings adding scenic interest to views. With a significant percentage of the shoreline in parks and conservation areas, the vegetation of wooded shores and wetlands contributes a natural dimension to the shoreline landscape. In some areas, such as City Island, the maritime atmosphere of harbors, wharves, boats, and associated shoreline buildings also lends a scenic attraction to the area because of the types of uses, activities, and movements which take place there. Because of the numerous parks and street ends along the Sound, there are many opportunities for access to enjoy the scenic views of the shore and water. Visual and physical access could be greatly expanded on City Island, if street end barricades were removed.

The highly developed nature of the communities means that there is little opportunity for new development. Changes will come about as a result of redevelopment of vacant land. Potential redevelopment sites exist in the Throgs Neck area of the Bronx.

NASSAU COUNTY

Nassau County occupies about 62 miles of shoreline on Long Island Sound from the New York City boundary eastward to Suffolk County. The county's shoreline is highly irregular and is indented by deep harbors and bays. The bays are separated by peninsulas, or necks, projecting into the Sound. The necks typically have narrow beaches backed by bluffs which gradually increase in height from west to east. While there are a limited number of tidal and freshwater wetlands and other natural habitats in the western part of the county, the middle and eastern sections have significant wetlands, beach habitats, contiguous upland forest habitats, and stream and pond environments within close proximity to the shoreline. Several important habitats are included in designations by the state as Significant Coastal Fish and

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Wildlife Habitats. A high proportion of the county's shoreline is man-made, ranging from about 75 percent in the western parts to 33 percent in the eastern parts of the county.

The land use characteristics of Nassau County are influenced by the natural necks and bays environment. The towns and villages are largely residential, with much of the population upper income. The most densely developed areas are in the west of the county. The shoreline is generally fully developed for low and medium density residential uses with pockets of waterfront industrial and commercial development, local parks, and private recreation facilities. There are many areas of low density estates, although these are under pressure for subdivision. Bayville features a dense area of residential development adjacent to the waterfront. This area consists of seasonal homes that have been converted to year-round housing.

Commercial and industrial development is generally located at the heads of the bays and along the major highway arteries. Commercial uses are limited to some locations in Oyster Bay hamlet, Bayville, Manorhaven, the Manhasset Bay side of Port Washington, and Great Neck. Industrial uses are concentrated on the west side of Hempstead Harbor in Port Washington, along the east side of the bay in the Glenwood Landing area, in the vicinity of the bay's Glen Cove Creek, and in the hamlet of Oyster Bay. There are also some industrial uses located on Manhasset Bay in Manorhaven and Port Washington, and along southern parts of the bay. Hempstead Harbor features the most intensively industrialized areas on the Long Island Sound, while the City of Glen Cove features the greatest variety of land uses within the coastal area.

Other land uses consist of significant amounts of open space and recreation. County and municipal parks provide numerous facilities for public access and recreation as well as protected natural areas. The Oyster Bay National Wildlife Refuge and Sagamore Hill National Historic Site are federal sites located along the county's shoreline. Water-dependent uses mainly serve the needs of the recreational boating industry, with other types of uses playing a diminishing role along the waterfront. In the harbors are numerous marinas, clubs, boat yards, and associated facilities catering to recreational boaters, who heavily use desirable locations, such as Manhasset Bay, which has the largest concentration of marina facilities of all the reaches on the Sound within Nassau and Suffolk counties.

Since 1970 the population in most of the Nassau County section of the Long Island Sound coastal region declined somewhat, except for the easternmost parts. However, the number of housing units increased, even in areas with population declines. The entire area showed significant decreases in household size and an aging population.

The indented shoreline of Nassau County, with its many coves, inlets, and bays backed by wooded hills, offers numerous natural and man-made scenic attractions. In spite of the highly developed, mostly residential character of the coastline, which is hidden in many places by the heavily wooded terrain, the interface of land and water still presents a pleasant prospect. There are numerous opportunities for views over water to nearby and distant shorelines from roads and parks. In several harbors catering to recreational boating, there are wharves, boats, and associated shoreline buildings, which are often attractive because of the types of uses, activities, and movements which take place in such areas.

The highly developed nature of the communities means that there is little opportunity for future growth along the shoreline and in the immediate coastal area. Changes will be limited to redevelopment of built or vacant sites within the developed areas, resulting in a change

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of use or increased density of development. Specific areas with potential for development and redevelopment are located around Manhasset Bay, Hempstead Harbor, and Oyster Bay. In these areas the relocation or elimination of industrial uses and utilization of vacant public land may provide some opportunities for redevelopment.

Table 7 shows estimates of the amount of land available for development or redevelopment by existing land use and current zoning and also shows the possible yield of residential units if this land were to be fully developed under current zoning regulations. The majority of land within the watershed area available for development or redevelopment is located within existing residentially zoned areas. Full development of this land in the coastal area and the watershed outside the coastal boundary could result in a yield of 1,337 and 3,635 dwelling units, respectively. Most of the residentially zoned land available for development is currently vacant or used for private recreation purposes. Within residential areas, the subdivision of private recreation facilities, such as golf courses, provides both a threat to the open space resources of Nassau County and an potential for further residential growth. This is particularly so in the area of the watershed outside the coastal boundary where there are 2,785 acres of residentially zoned land currently used for private recreation purposes that could yield 1,393 dwelling units. There is very little land currently zoned commercial or industrial available for development or redevelopment.

The population and housing figures for the Nassau County watershed area showed a decline in population of 8,550 persons and an increase in housing units of 8,557 between 1970-90. Given this trend that suggests that demand for housing units will continue despite a stable or declining population, it is quite possible that the full residential yield possible under current zoning of 5,022 units on the 8,770 acres of land available for development or redevelopment will be required.

The land use and community character of Nassau County's coastal communities are considered below.

Town of North Hempstead

The Town of North Hempstead includes 16 villages with frontage on the Long Island Sound and a smaller amount of waterfront land composed of the town's unincorporated areas. The town's 28.8 linear miles of shoreline include three embayments of the Sound, the eastern portion of Little Neck Bay, all of Manhasset Bay, and the western portion of Hempstead Harbor. The town's 1990 population of 211,393 has declined from 218,624 in 1980.

The majority of the coastal area consists of low and medium density residential uses, with much high value housing generally located close to the Sound. The most significant industrial uses are located in the Glenwood Landing section of Hempstead Harbor, consisting of utility facilities and oil transfer and storage facilities. Other industrial uses are concentrated on the west side of Hempstead Harbor in Port Washington. Among these uses is the former Port Washington sand and gravel facility. There are also some industrial uses located on Manhasset Bay in Manorhaven and Port Washington, and along southern parts of the bay. Water-dependent uses serving recreational boating are important in several areas, particularly Manhasset Bay, which has a large concentration of marina facilities and other commercial uses catering to recreational boaters. Commercial uses along the town's shore are limited to areas in Manorhaven and the Manhasset Bay side of Port Washington. The county, town, and villages operate several local parks, beaches, and natural areas offering both active and passive recreation for local residents.

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Table 7 Land Available for Development or Redevelopment, Nassau County

CURRENT LAND USE		EXISTING ZONING											
		Agriculture		Commercial		Industry		Recreation		Residential		Total	
		Acres	Yield	Acre	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield
Coastal Area	Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
	Commercial	0	0	0	0	0	0	0	0	7	31	7	31
	Industrial	0	0	0	0	0	0	0	0	0	0	0	0
	Large Estates	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	0	3	0	0	0	0	0	100	24	103	24
	Priv Recreation	0	0	0	0	24	0	0	0	470	427	494	427
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	425	573	425	573
	Vacant	0	0	5	0	12	0	0	0	653	282	670	282
	Wetlands	0	0	0	0	2	0	0	0	438	0	440	0
	Total	0	0	8	0	38	0	0	0	2093	1337	2139	1337
Watershed Area Outside of Coastal Area	Agriculture	0	0	0	0	0	0	0	0	361	116	361	116
	Commercial	0	0	0	0	0	0	0	0	97	552	97	552
	Industrial	0	0	0	0	0	0	0	0	0	0	0	0
	Large Estates	0	0	0	0	0	0	0	0	46	45	46	45
	Other	0	0	0	0	0	0	0	0	122	118	122	118
	Priv Recreation	0	0	0	0	0	0	0	0	2785	1393	2785	1393
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	0	0	25	0	45	0	0	0	2701	1409	2771	1409
	Wetlands	0	0	0	0	2	0	0	0	126	0	128	0
	Total	0	0	25	0	47	0	0	0	6238	3633	6310	3633
Watershed Area	Agriculture	0	0	0	0	0	0	0	0	361	116	361	116
	Commercial	0	0	0	0	0	0	0	0	104	583	104	583
	Industrial	0	0	0	0	0	0	0	0	0	0	0	0
	Large Estates	0	0	0	0	0	0	0	0	46	45	46	45
	Other	0	0	3	0	0	0	0	0	222	142	225	142
	Priv Recreation	0	0	0	0	24	0	0	0	3255	1820	3279	1820
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	425	573	425	573
	Vacant	0	0	30	0	57	0	0	0	3354	1691	3441	1691
	Wetlands	0	0	0	0	4	0	0	0	564	0	568	0
	Total	0	0	33	0	85	0	0	0	8331	4970	8449	4970

NOTE: Yield is residential units

Source: Long Island Regional Planning Board, 1993.

Hempstead Harbor was once the busiest port on Long Island, based on the annual tonnage of materials transported. Most of this weight reflected outbound barge shipments of locally mined sand and gravel from the Port Washington sand pits, which encompassed more than 1,000 acres. The last local sand mine operation closed in 1988 and the pits have been

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abandoned. Portions of the area have been restored for commercial use, while other areas await further restoration and redevelopment.

Undeveloped Nassau County parklands occupy the former site of the Colonial Sand and Gravel Mine and encompass the northernmost ±250 acres of the sand pits. The southernmost ±200 acres of the sand pits have been developed as two industrial parks. The south-central ±140 acres of the sand pits were used by the Town of North Hempstead as a municipal landfill. Approximately ±450 acres in the north-central portion of the sand pits, land formerly owned by the Morewood Realty Corporation, had been acquired by the Town of North Hempstead for the development of solid waste management facilities. The town has concluded that this site is no longer needed for solid waste management purposes and plans to sell this large parcel in the near future. The area is residentially zoned and could yield over 570 dwelling units.

The Town of North Hempstead is preparing a conceptual development plan for the Morewood site that takes into account the physical limitations of the site, which has been scarred by years of sand mining; the limits of the available infrastructure; the need for the town to reduce its onerous debt on the property; and the potential the site holds for recreation, open space, and revitalization of the town's waterfront area.

The town has established goals and priorities to guide preparation of the conceptual plan. To enhance the open space and recreation value of the site, only a portion of the 450 acres will be developed. Natural features, water quality, scenic values, and views will be protected. Finally, the conceptual plan will capitalize on the site's waterfront location while eliminating or reducing any impact on the harbor from development.

A consulting team has been hired, which includes expertise in the planning of large sites, environmental engineering, market research, traffic analysis, historic and archaeological resources, and financial feasibility analysis. The town has also recognized the regional importance of the site and the need for cooperative planning. A coalition has been formed consisting of business and development leaders, representatives of community groups, environmental organizations, the New York State Office of Economic Development and the Department of State, the Nassau County Planning Commission, and New York State Assemblyman DiNapoli's office. This group will assist and advise the town and its consultants on the parameters of site development.

The waterfront strip of land east of West Shore Road fronting on Hempstead Harbor, from the southern boundary of the Village of Sands Point to the Roslyn central business district, contains a mix of residential, industrial, and recreational uses. A beachfront community of 41 bungalows, known as the Beacon Hill Colony, occupies the northernmost segment of this strip of land. South of the bungalow community is the dockage area of the Gotham Sand and Stone Corp., which receives waterborne shipments of crushed stone. There are also a number of deteriorated and abandoned industrial facilities in this area that were used for the repair of tugboats and barges used in the export of sand. South of this industrial area are two public bathing beaches, Hempstead Harbor County Beach and the Town of North Hempstead's Bar Beach, which have extensive sandy shorelines. The shoreline area south of Bar Beach is primarily vacant and owned by the town, with some parcels containing remnants of equipment from previous sand and gravel operations. At the southern end, close to Roslyn, is the site of the former Town of North Hempstead incinerator. Although no longer functioning as an incinerator, the site is now utilized for shredding and bailing solid waste materials prior to disposal. Hempstead Harbor contains a large number of derelict and

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abandoned sand and gravel barges, which are being removed by the Army Corps of Engineers.

As noted previously, the sand pit area north of the town landfill needs reclamation prior to any development. A slope stabilization program is needed to protect adjacent residential structures against potential slope failure. The ±450 acres in the north-central portion of the sand pits that will be sold by the town could accommodate a clustered residential development that would not be in conflict with any of the surrounding areas, and would not be of the intensity to encourage extensive peak hour travel on a limited road system. The proportion that would remain in open space should reflect the limitations of the infrastructure and the physical constraints on the site. Chapter 3 (volume 2), The Public Coast, provides a discussion of parkland development potential in this area.

Town of Oyster Bay

The Town of Oyster Bay has a shoreline of approximately 55 miles on the Sound and includes eight villages on the Sound coast. Only a small portion of the town's waterfront is located outside of these incorporated municipalities. Oyster Bay Harbor, Cold Spring Harbor, and parts of Hempstead Harbor are included within the town. From a 1980 population of 305,750, the town's population declined to a figure of 292,657 in 1990.

Most land uses in the town are low and medium density residential, with a few spots of high density housing. There are industrial and commercial uses in the hamlet of Oyster Bay. Water-dependent uses are concentrated in the hamlet, including a public marina and boat ramp, facilities for recreational boaters who heavily use Oyster Bay Harbor, an oil receiving and storage facility, and the last surviving oyster company on Long Island. The town contains numerous public lands offering a variety of public access and recreational facilities. Federal lands include the Oyster Bay National Wildlife Refuge and the Sagamore Hill National Historic Site. The county, town, and villages operate a several parks, beaches, and natural areas offering both active and passive recreation for local residents.

Specific areas with potential for development and redevelopment are located in the hamlet of Oyster Bay. The Commander Oil storage terminal, although currently operating as a water-dependent industry, is no longer strictly water-dependent, as oil can be off-loaded at offshore platforms and the petroleum product piped to inland locations. In the event that the Commander Oil terminal ceases to operate, the tank farm site as well as adjacent non-water-dependent uses should be redeveloped. Any redevelopment in Oyster Bay should be compatible with the adjacent waterfront parks and not threaten the continued operation of the commercial shellfishery in the Oyster Bay Harbor complex.

City of Glen Cove

The City of Glen Cove has a 9.47 mile shoreline, primarily on Hempstead Harbor. The city's 1990 population of 24,149 represents a small decline from 1980's figure of 24,618.

Land uses in the coastal area are varied. While most of the shoreline is devoted to residential and park uses, there are highly industrialized sites along Glen Cove Creek. Industrial uses are concentrated along the north side of Glen Cove Creek, the eastern half of which is the most intensively industrialized area on the north shore of Long Island. Past industrial land uses have contaminated properties adjacent to the creek with toxic wastes and radioactive material. Along the south side of the creek are some water-dependent uses consisting of several marinas and public recreation facilities. Both the city and county

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operate waterfront parks and natural areas offering a variety of active and passive recreation opportunities.

Major opportunities exist in the City of Glen Cove for redevelopment around Glen Cove Creek. The area includes a mix of water-dependent, water-enhanced, and non-water-dependent uses. Interspersed with industrial uses are vacant, derelict and abandoned sites, public uses, marinas, and recreation facilities. The greatest concentration of Superfund sites on the Sound is located in this area. Redevelopment of this currently inefficiently utilized waterfront area will require accelerated clean-up of the Superfund sites, phasing out of inappropriately located non-water-dependent uses, infrastructure and environmental improvements, and provision of public access.

SUFFOLK COUNTY

Land use patterns and development trends divide Suffolk County into three distinct sub-regions. These are the western section of the county from Cold Spring Harbor to Wading River, the eastern section of the county from Wading River to Orient Point, and Fishers Island.

Suffolk County offers a wide variety of scenic appeal in its long north shore coastline. The attractions of recreational boating harbors with their maritime ambience contrast with the many kinds of highly scenic natural areas ranging from wetlands, ponds and beaches, to high bluffs, dunes, islands, and upland forests. While the western and middle parts of the county's shoreline are highly developed with mostly residential uses, the terrain and the large, wooded lots hide much of the development and give many areas a scenic, semi-rural feeling. The significant amounts of agricultural lands remaining in the eastern part of the county, sometimes with historic farmhouses, lend a captivating rural atmosphere to the coastal landscape. There are many places with extensive, long views over land and water, sometimes across the Sound to Connecticut.

Western Suffolk County occupies approximately 115 miles of the Sound shoreline from the Nassau County boundary eastward to Wading River. In this section of the county the shoreline is highly varied, with numerous harbors and embayments, barrier sand spits, bluff formations, beaches, dunes, tidal wetlands, inland freshwater wetlands, upland forests, and ponds. A considerable portion of the shore is man-made, with structures consisting of bulkheads, seawalls, and revetments. The few streams are small and short in length, except for the Nissequogue River, the largest river on Long Island draining into the Sound, which has been designated as a Wild, Scenic, and Recreation River by the state. Several important habitats are included in designations by the state as Significant Coastal Fish and Wildlife Habitats.

The shoreline of western Suffolk County is generally fully developed for low and medium density residential uses with pockets of waterfront industrial and commercial development, state and local parks, and private recreation facilities. The low to medium density residential development clusters around small downtown commercial cores and harbors are linked by lower density residential development. There are some institutional and utility uses located on the waterfront. Other land uses include a small amount of agriculture, and large amounts of open space and recreation. County and municipal parks plus two state parks at Caumsett and Sunken Meadow provide facilities for public access and recreation as well as protected natural areas. A federal wildlife refuge, Target Rock, is located on Huntington Bay in Lloyd Harbor.

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There are some significant commercial and industrial uses in Huntington hamlet and Port Jefferson. Water-dependent uses mainly serve the needs of the recreational boating industry. In the many harbors are numerous marinas, clubs, boat yards, and associated facilities catering to recreational boaters who heavily utilize desirable locations such as Huntington Harbor during the peak summer months.

Population change since 1970 has been uneven, with some parts of the western section of the county slightly declining and others significantly increasing in population. In all areas, however, the number of housing units increased substantially, even in areas with population declines.

The highly developed nature of the communities means that there is little opportunity for future growth along the shoreline and in the immediate coastal area. Changes will primarily be limited to redevelopment of built or vacant sites within the developed areas. Such redevelopment would often require a change of use or increased density of development. The major areas with potential for redevelopment are the Kings Park Psychiatric Center, Port Jefferson Harbor, and Shoreham Nuclear Power Station.

Table 8 shows estimates of the area of land available for development or redevelopment by existing land use and current zoning and the possible yield of residential units if these areas were to be fully developed under current zoning regulations. Within the watershed area, the majority of land available for development or redevelopment is located within existing residentially zoned areas. Full development of this land could result in a yield of 2,693 residential units in the coastal area and 5,911 residential units in the watershed area outside the coastal boundary. Most of the residentially zoned land available for development is currently in vacant institutional use, primarily the Kings Park Psychiatric Center, or used for private recreation purposes. Within residential areas, the subdivision of private recreation facilities, such as golf courses, provides both a threat to the open space resources of western Suffolk County and a potential for further residential growth. This is particularly so in the watershed area outside the coastal boundary, where there are 1,004 acres of residentially zoned land currently used for private recreation purposes that could yield 1,049 residential units. There is very little currently commercial or industrial zoned land available for development or redevelopment within the coastal area. Within this area, the subdivision of large estates provides some potential for further residential growth. In the coastal area and the watershed area outside the coastal boundary, there are 267 acres and 212 acres, respectively, of residentially zoned land that is currently used for agriculture.

Eastern Suffolk County has a coastline of approximately 60 miles stretching from Wading River to Orient Point. In contrast with western Suffolk County, this section of the county shoreline is very regular, consisting predominantly of a linear beach and extensive bluff formation, with rapid erosion occurring along bluff faces in some places. Additional important natural coastal features in the sub-region include tidal and freshwater wetlands, ponds, dunes, and upland forests. Mattituck Creek is the only major embayment in this section of the shoreline. Slightly over 10 percent of the shoreline is man-made, consisting of bulkheads, sea walls, and revetments. Important wetland habitat along Wading River has been designated by the state as a Significant Coastal Fish and Wildlife Habitat.

The shoreline of eastern Suffolk County is predominantly open agricultural and forest lands with intermittent enclaves of low and medium density residential development in hamlets and residential subdivisions. Moving from west to east, land uses change from primarily low, medium, and medium-high density residential to agricultural, vacant, and open

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Table 8 Land Available for Development or Redevelopment, Western Suffolk County

CURRENT LAND USE		EXISTING ZONING											
		Agriculture		Comm'l		Industry		Recreation		Residential		Total	
		Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield
Coastal Area	Agriculture	0	0	0	0	0	0	0	0	267	145	267	145
	Commercial	0	0	0	0	0	0	0	0	40	52	40	52
	Industrial	0	0	0	0	0	0	0	0	8	3	8	3
	Large Estates	0	0	0	0	0	0	0	0	466	205	466	205
	Other	0	0	0	0	0	0	0	0	1152	602	1152	602
	Priv Recreation	0	0	0	0	0	0	0	0	243	117	243	117
	Residential	0	0	1	0	0	0	0	0	0	0	1	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	0	0	3	0	0	0	0	0	2112	1569	2115	1569
	Wetlands	0	0	0	0	0	5	0	0	1167	0	1172	0
	Total	0	0	4	0	0	5	0	0	5455	2693	5464	2693
Watershed Area Outside of Coastal Area	Agriculture	0	0	3	0	0	0	0	0	212	159	215	159
	Commercial	0	0	35	0	0	0	0	0	82	144	117	144
	Industrial	0	0	0	0	27	0	0	0	30	25	57	25
	Large Estates	0	0	0	0	0	0	0	0	35	12	35	12
	Other	0	0	0	0	41	0	0	0	510	408	551	408
	Priv Recreation	0	0	0	0	0	0	0	0	1004	1049	1004	1049
	Residential	0	0	21	0	8	0	0	0	0	0	29	0
	Sand Mining	0	0	0	0	0	0	0	0	12	10	12	10
	Vacant	0	0	76	0	226	0	0	0	2709	4104	3011	4104
	Wetlands	0	0	0	0	0	0	0	0	72	0	72	0
	Total	0	0	135	0	302	0	0	0	4666	5911	5103	5911
Watershed Area	Agriculture	0	0	3	0	0	0	0	0	479	304	482	304
	Commercial	0	0	35	0	0	0	0	0	122	196	157	196
	Industrial	0	0	0	0	27	0	0	0	38	28	65	28
	Large Estates	0	0	0	0	0	0	0	0	501	217	501	217
	Other	0	0	0	0	41	0	0	0	1662	1010	1703	1010
	Priv Recreation	0	0	0	0	0	0	0	0	1247	1166	1247	1166
	Residential	0	0	22	0	8	0	0	0	0	0	30	0
	Sand Mining	0	0	0	0	0	0	0	0	12	10	12	10
	Vacant	0	0	79	0	226	0	0	0	4821	5673	5126	5673
	Wetlands	0	0	0	0	5	0	0	0	1239	0	1234	0
	Total	0	0	139	0	307	0	0	0	10121	8604	10567	8604

NOTE: Yield is residential units

Source: Long Island Regional Planning Board, 1993.

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space/recreational uses, although even in the east, low and medium density residential land uses exist near the coast. The inlets located at breaks in the bluffs provide a focus for more concentrated seasonal and year-round residential and commercial development. This section of the county is in the process of change, developing from a rural agricultural region with seasonal communities to year-round residential areas. The undeveloped nature of the area and its accessibility to new employment opportunities in Brookhaven are part of the attraction of the area.

The majority of commercial development is found along Route 25A in a typical strip commercial pattern. The only industrial use is found at Northville, where oil storage tanks receive oil by pipeline from an offshore terminal. Industrial uses at Mattituck Creek have been discontinued, with abandonment of oil storage tanks and a phaseout and removal of various industrial uses on the west side of the mouth of the creek.

Wildwood State Park and county, town, and local park districts provide public access and recreational facilities, including numerous bathing beaches. Most local beach facilities have restrictions against nonresident use, although some do allow nonresidents, but charge higher fees. Undeveloped parks or facilities, such as nature preserves, offering passive recreation tend to have fewer restrictions against nonresident use. Recreational boating facilities are found in Mount Sinai Harbor and Mattituck Creek.

Population within the coastal area in the eastern part of the county has more than doubled since 1970, with a substantial increase in the number of housing units. The Town of Southold showed a slight population decrease in the coastal area, although there was still an increase in the number of housing units. There were notable decreases in household size in the watershed area. The Town of Southold continues to be a retirement and second home area, with one-third of the year-round population aged 55 or older and a summer population increase of more than 125 percent over the year-round average.

Eastern Suffolk County has the greatest potential for change through new development and redevelopment of seasonal residences. Current zoning allows for a wide range of residential development, and, without action to protect farmland and rural character, it is likely that suburban residential growth will continue to spread east. In order to protect agriculture and open space, Suffolk County, the Town of Riverhead, and the Town of Southold have agricultural protection programs that include purchase of development rights and clustering requirements. As a result of agricultural and groundwater protection efforts, pressure to develop along the shoreline has intensified. The LILCO site at Jamesport has potential for redevelopment.

Table 9 shows estimates of the amount of land available for development or redevelopment by existing land use and current zoning and also shows the possible yield of residential units if this land were to be fully developed under current zoning regulations. The majority of land available for development is currently vacant or used for agriculture and is either zoned for agricultural or residential use. Development of all land currently in agricultural use could yield 692 dwelling units on 1,099 acres within the coastal area and 2,565 dwelling units on 3,764 acres in the watershed area outside the coastal boundary. There is very little commercial or industrial zoned land available for development or redevelopment within the watershed area.

Fishers Island, a 3,200 acre island lying offshore of the Town of Southold, has a coastline of 24 miles. The shoreline is mostly rocky, with some bluffs and beaches. Hungry Point

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Table 9 Land Available for Development or Redevelopment, Eastern Suffolk County

CURRENT LAND USE		EXISTING ZONING											
		Agriculture		Commercial		Industry		Recreation		Residential		Total	
		Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield
Coastal Area	Agriculture	749	364	34	54	0	0	8	10	308	264	1099	692
	Commercial	0	0	0	0	0	0	0	0	0	0	0	0
	Industrial	158	126	0	0	0	0	0	0	0	0	158	126
	Large Estates	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	130	104	130	104
	Priv Recreation	90	72	0	0	0	0	85	124	118	120	293	316
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	44	35	52	69	0	0	55	56	1075	829	1226	989
	Wetlands	0	0	0	0	5	0	0	0	118	0	123	0
	Total	1041	597	86	123	5	0	148	190	1749	1317	3029	2227
Watershed Area Outside of Coastal Area	Agriculture	2132	1237	26	25	136	102	10	16	1460	912	3764	2292
	Commercial	0	0	0	0	0	0	0	0	0	0	0	0
	Industrial	0	0	0	0	0	0	0	0	0	0	0	0
	Large Estates	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	29	22	29	22
	Priv Recreation	0	0	0	0	0	0	122	108	60	48	182	156
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	181	194	33	24	30	24	0	0	1076	962	1320	1204
	Wetlands	3	0	0	0	0	0	0	0	0	0	3	0
	Total	2316	1431	59	49	166	126	132	124	2625	1944	5298	3674
Watershed Area	Agriculture	2881	1601	60	79	136	102	18	26	1768	1176	4863	2984
	Commercial	0	0	0	0	0	0	0	0	0	0	0	0
	Industrial	158	126	0	0	0	0	0	0	0	0	158	126
	Large Estates	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	159	126	159	126
	Priv Recreation	90	72	0	0	0	0	207	232	178	168	475	472
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	225	229	85	93	30	24	55	56	2151	1791	2546	2193
	Wetlands	3	0	0	0	5	0	0	0	118	0	126	0
	Total	3357	2028	145	172	171	126	280	314	4374	3261	8327	5901

NOTE: Yield is residential units

Source: Long Island Regional Planning Board, 1993.

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Islands and Fishers Island Beaches have been designated by the state as Significant Coastal Fish and Wildlife Habitats, while the whole of the island has been designated as a critical environmental area. Fishers Island is a predominantly seasonal resort community with a small business area and a cluster of year-round homes on the western end of the island. Much of the coastal land on Fishers Island is either vacant or low density residential. It has an estimated peak seasonal population of 3,500, but a year-round population of only 329, a drop of 74 since 1970.

Major changes in land use and character are not anticipated because of the island's inaccessibility, although infill housing and small subdivisions are likely. Table 10 shows estimates of the amount of land available for development or redevelopment by existing land use and current zoning and also shows the possible yield of residential units if this land were to be fully developed under current zoning regulations.

Table 10 Land Available for Development or Redevelopment, Fishers Island

CURRENT LAND USE		EXISTING ZONING											
		Agriculture		Commercial		Industry		Recreation		Residential		Total	
		Acres	Yield	Acres	Yield	Acre	Yield	Acres	Yield	Acres	Yield	Acre	Yield
Coastal Area	Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
	Commercial	0	0	0	0	0	0	0	0	0	0	0	0
	Industrial	0	0	0	0	0	0	0	0	0	0	0	0
	Large Estates	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0	0	233	17	233	17
	Priv Recreation	0	0	0	0	0	0	0	0	182	48	182	48
	Residential	0	0	0	0	0	0	0	0	0	0	0	0
	Sand Mining	0	0	0	0	0	0	0	0	0	0	0	0
	Vacant	0	0	9	0	0	0	0	0	796	268	805	268
	Wetlands	0	0	0	0	0	0	0	0	98	0	98	0
	Total	0	0	9	0	0	0	0	0	1309	333	1318	333

NOTE: Yield is residential units

Source: Long Island Regional Planning Board, 1993

The land use and community character of Suffolk County's coastal communities are considered below.

Town of Huntington

The Town of Huntington, including the villages of Asharoken, Huntington Bay, Lloyd Harbor, and Northport, has about 64 linear miles of shoreline characterized by rolling hills, bluffs, beaches, and picturesque harbors. The town and villages are largely residential, with much of the population upper income and the area dominated by large single family houses built on large lots. Narrow, winding roads serve these neighborhoods, which retain a semi-rural atmosphere due to dense, mature vegetation and deep building setbacks. More recent construction has been relatively unobtrusive because of strict local zoning laws.

The town's 1990 population of 191,474 represents a decline of about 10,000 from 1990.

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In three of the four villages—Asharoken, Huntington Bay, and Lloyd Harbor—there are no commercial or industrial uses, the only other uses besides residential being institutional and recreation/open space. Non-water-dependent commercial uses are found in the Village of Northport and in the areas of Centerport, Cold Spring Harbor, and Huntington. North of Northport village is a LILCO generating plant, the largest oil-fired generating plant in the nation. The popularity of recreational boating means that water-dependent uses are important in several areas, including Centerport, Northport, and particularly in the Huntington Harbor area where there are yacht clubs, marinas, boat yards, mooring facilities, and other commercial uses catering to fishermen and recreational boaters.

The villages and the town operate a number of local parks, beaches, and marinas. Several homeowner associations also operate beaches for members only. Caumsett State Park, at 1,500 acres the largest tract of open space within Huntington's coastal zone, and Target Rock National Wildlife Refuge constitute the only state and federal lands, respectively, in the town's coastal zone.

Town of Smithtown

The Town of Smithtown, encompassing Smithtown Bay, has a shoreline of approximately 36.5 miles and includes two villages, Nissequogue and Head-of-the-Harbor, within its coastal boundary. The town's 1990 population of 113,406 was approximately the same as in 1980. Because of the large amounts of publicly owned land within the coastal area, population density in the waterfront area is much lower than in the rest of the town.

Low and medium density residential land use predominates in the waterfront area. Within the two villages, a large proportion of the residential land is occupied by estates. Commercial uses in the waterfront area are limited in extent and found in the western edge of the Smithtown central business district, but they are not water-dependent uses. There are numerous recreational parks and nature preserves in the town, the largest being Sunken Meadow and Caleb Smith state parks, which together include almost 2,000 acres. Local parks include both facilities for active recreation, such as beaches, as well as nature preserves.

The Kings Park Psychiatric Center (KPPC) lies in the coastal area and is a large area of land with redevelopment potential. The center covers approximately 565 acres, comprising patient and employee residences, recreational facilities, two yacht clubs, a power plant, a landfill, abandoned fields, and woodland. It is currently zoned for one-acre residential development. Prior to the New York State deinstitutionalization policy, the KPPC had a group quarters population of over 6,000 persons. The Town of Smithtown LWRP established the criteria for the development of a master plan which is being prepared for the reuse of the property. This would include the adaptive reuse of the core area of the center for a mix of uses, with some of the existing residential property developed for housing.

Town of Brookhaven

The Town of Brookhaven, including the villages of Old Field, Poquott, Port Jefferson, and Shoreham, has about 49 linear miles of shoreline along the Sound. Its 1990 population of 407,915 represents an increase of 45,000 over the 1980 figure.

Land use within the town's coastal area is primarily single family residential, although there are significant commercial, industrial, and utility uses in Port Jefferson and LILCO's nuclear power plant at Shoreham. Recreational uses consist of town and village parks and beaches,

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mostly concentrated along the western end of the town's shoreline, and numerous private beaches operated by nearby neighborhood associations. The Village of Port Jefferson has become a regionally important tourist destination in recent years, partly because of its terminal location for the ferry to Connecticut. Marine oriented water-dependent uses are also concentrated in the western half of the town's shoreline, with numerous yacht clubs, marinas, boat yards, mooring facilities, and other commercial uses catering to fishermen and recreational boaters.

Two specific areas with potential for development and redevelopment are located in the Town of Brookhaven: Port Jefferson Harbor and the Shoreham Nuclear Power Plant.

The head of Port Jefferson Harbor contains a large town marina, a cross-Sound ferry terminal, and mixed industrial and commercial uses. The Port Jefferson waterfront exemplifies the ongoing trend in north shore harbors to remove obsolete or non-water-dependent industrial uses that formerly occupied strategic locations along the waterfront and replace them with commercial and recreational uses that provide greater public access. Redevelopment and expansion of downtown Port Jefferson have occurred over a short period of time and have transformed it into an active tourist center. The village's objective for redevelopment in Port Jefferson continues in this direction, seeking to facilitate water-dependent commercial and recreational development that will maintain and enhance the vitality of the village shoreline and improve public access, all without impairing the historic and scenic quality of the village.

The Shoreham Nuclear Power Plant is being decommissioned. Alternative uses of the plant site are under investigation. A portion of the site has been proposed for the development of a terminal for high speed ferries connecting Shoreham with New Haven, Connecticut. Chapter 4 (volume 2), The Working Coast, presents a more detailed discussion of the ferry proposal.

West Meadow Beach is a narrow 150-acre barrier spit in the Town of Brookhaven. The town owns approximately 50 acres, which includes a town beach and dedicated parkland on which some 95 privately owned cottages exist. The seasonal cottages are sited on leased lots, and the town recently renewed the leases on the lots until 2006. A court nullified the leases, noting that as dedicated parkland, West Meadow Beach cannot be alienated from public use without approval of the state legislature. The recently prepared town master plan and DEIS for West Meadow Beach presents the town's policy to reclaim the land for public park purposes. The provisions of the master plan would guide future use of the area, unless the town pursues alienation of the area. The plan proposes the eventual removal of the private cottages from town property and the reuse of the land for subsequent activities designed to enhance natural resource values, environmental education, and compatible recreational use opportunities for town residents. The master plan concludes that the high level of environmental, educational, and recreational benefits that town residents would realize as a result of the implementation of the proposed master plan far outweighs the short-term disturbance to the site caused by the removal of the cottages.

Town of Riverhead

The Town of Riverhead has approximately 27 miles of shoreline along the Sound. The town's 1990 population of 23,011 is an increase of 3,000 from the 1980 figure.

Coastal land uses in the town vary from open space, recreation, and agriculture in the central and eastern parts of the town, with some residential uses, to primarily residential from

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Wildwood State Park west to the Brookhaven town boundary. The eastern end of the town has numerous seasonal residences. The seasonal population increases the town's year around population by 56 percent. There are many private beaches operated by nearby neighborhood associations. There are five town beaches, four of which are for town residents only, and one major state park, Wildwood. The lack of natural harbors in the town has restricted the development of commercial water-dependent facilities for the recreational boater.

There are two large industrial sites in Riverhead. These are the Northville Oil terminal site and the vacant LILCO site at Jamesport. The oil terminal site is the only industrial use on the Sound in this part of the county. In the past, this operation has been considered water-dependent, although changing patterns of use and methods of supply have altered the use of the site. Oil is now pumped ashore from an off-shore platform and many of the tanks are unused, as long-term storage of oil has declined. A former sand mining operation has disturbed a portion of a 518-acre site now owned by LILCO at Jamesport. Once the site of a proposed power plant, the northern portion is vacant and the southern portion is in active agricultural use. This site has the potential for redevelopment and it has been recommended as part of a larger transfer of development rights (TDR) receiving area that could accommodate clustered residential development, accommodating residential development credits from agricultural and groundwater protection areas within the town.

Town of Southold

The Town of Southold has a coastline of about 58 miles along the Sound, including Fishers Island and Plum Island. The population within the coastal area has decreased slightly since 1970, although there has been an increase in the number of occupied housing units. The population of the entire town was 19,836 in 1990, a slight increase over 1980's figure of 19,172.

Much of the town's immediate shoreline is vacant, with agricultural uses predominating. However, there are also scattered low and medium density residential land uses near and along the coast. Many of the residences are seasonal, with the proportion of such units having grown from 31 to 34 percent since 1970, indicating that the town continues to be a substantial second-home community.

Other land uses in the town include water-dependent marine recreational uses along Mattituck Creek, the only location along the town's Sound shoreline providing public marina facilities and the only safe harbor on the Sound shore between Orient Point and Mount Sinai Harbor. In Mattituck Creek, oil storage use has been abandoned, and there has been a phaseout and removal of various industrial uses on the west side of the mouth of the creek. There are numerous county, town, and park district parks along the Sound offering a variety of active and passive recreation. Four of the town's beaches are open to nonresidents but they must pay a higher fee than residents. There are numerous private beaches operated by nearby neighborhood associations.

Plum Island is wholly owned by the federal government and is quarantined due to restricted scientific research undertaken there. Fishers Island is primarily a summer community. Its coastal lands are either vacant or low density residential, with some recreational uses present in the form of golf courses and private marinas.

Mattituck Creek contains a working waterfront that has some redevelopment potential. The oil storage facility has been abandoned, and the phaseout and removal of various industrial uses on the west side of the mouth of Mattituck Creek provides an opportunity for the

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establishment of other uses. The area could accommodate a mix of recreation, marine recreation, marine commercial, and various public uses.

Historic and Archaeological Resources

A major component of community character is a community's history. The survival of archaeological sites and historic structures provides a tangible link to the past development of a community and offers current residents a sense of place. The Long Island Sound coastal region has a moderate to high sensitivity for sites in all prehistoric stages and many intact historic resources and structures. Unfortunately, large numbers of prehistoric and historic sites have been lost as a result of urban growth and its associated development. Further development pressure will continue to threaten these resources. In spite of the built-up nature of the Long Island Sound shoreline, many historic structures have survived and archaeological sites still exist, lying relatively intact beneath the shallow foundations of old structures and throughout the developed areas.

Maps 3.0-3.6 show that much of the Long Island Sound shoreline has multiple site sensitivity, indicating the possibility of archaeological remains. Sites have been found with evidence from all stages of prehistoric culture, from the Paleo-Indian and Archaic to the Woodland stages. Site types have included villages, camps, rock shelters, shell middens, and related artifact scatters. Most of the sites have exhibited multi-component finds. Concentrations of prehistoric sites are associated with a narrow flat corridor adjacent to the present Long Island Sound shoreline. Known sites are identified with shoreline configurations that emerged with the stabilization of sea level, notably associated with tidal inlets, bays, and marshy areas as they existed prior to the draining and filling of the coastline that has occurred in the last century. It has been established that many early prehistoric sites are now submerged as a consequence of rising sea level. Apart from around-river terraces, freshwater ponds, and knolls, inland locations are less likely to show remains, partly in the way that they were utilized in the prehistoric era, but also because of the bedrock outcrops, shallow soil, and considerable disturbance by development.

The Contact Period began with the first interaction between Native American societies and the European explorers, traders, and colonists. The scarcity in archaeological sites of Native Americans from this period is due in part to the rapid destruction and removal of the Native Americans by the Europeans. The areas of Native American settlement were generally prime locations and became the areas of initial European settlement. Development and redevelopment have destroyed much of the record of the Contact Period; however, sites may still exist, even in the most developed areas, and further development and redevelopment of any site which involves ground disturbance are likely to reveal archaeological resources which will lead to a better understanding of the area's prehistory or history.

Archaeological remains from the seventeenth century include evidence of the many grist mills that once occupied nearly every available tidal inlet, early agricultural practices, transportation routes, early landing sites, industrial sites, and residential buildings. Development and redevelopment have limited the presence of archaeological remnants from this era.

The State and National Registers of Historic Places are the official lists of the state and nation's cultural resources worthy of preservation. The location of individual listings, thematic listing, and historic districts on the State and National Registers of Historic Places are shown on maps 3.0-3.6. A detailed inventory of historic resources is presented in appendix 1.

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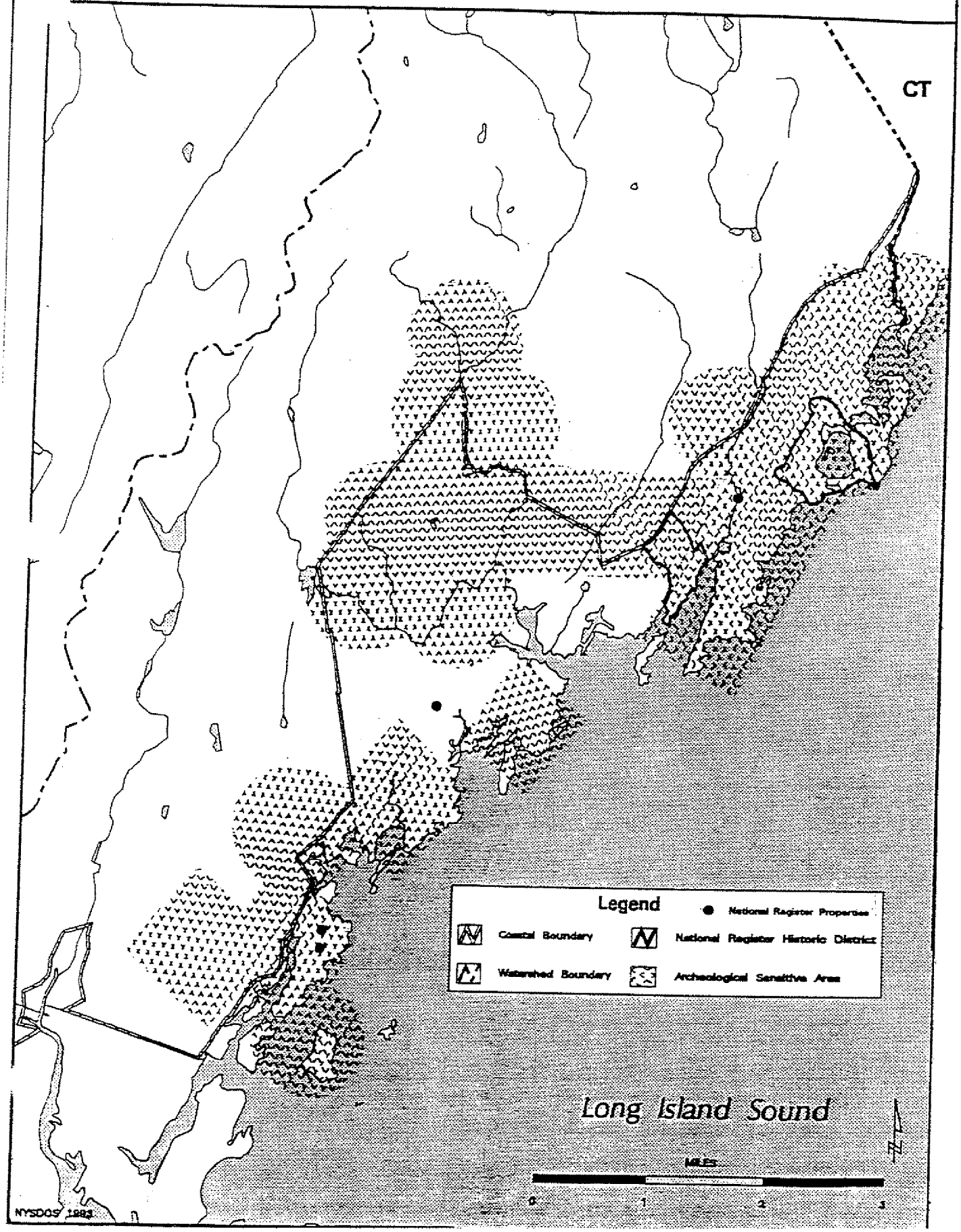
Westchester County

MAP 3.0

Historic Districts



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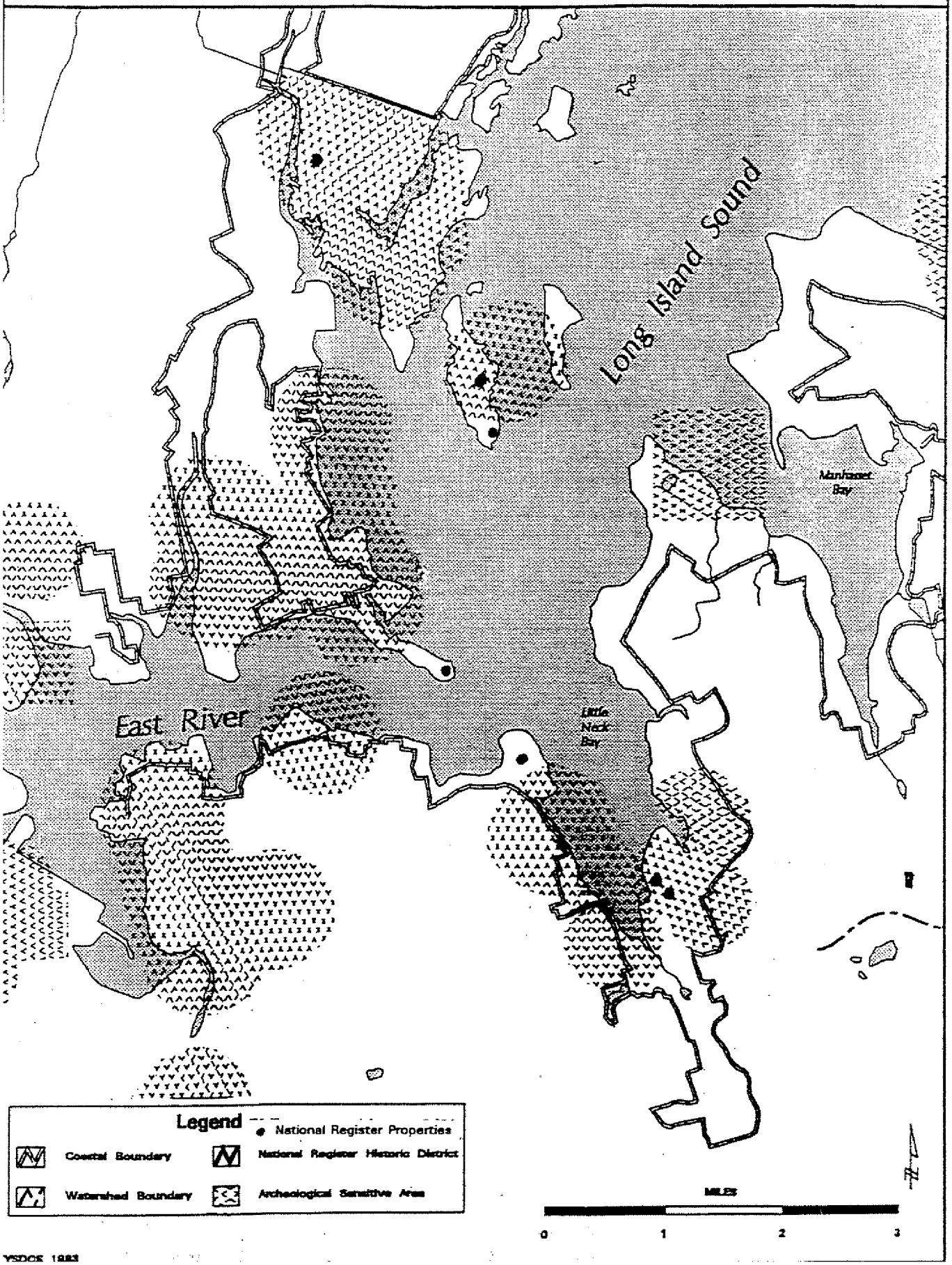
MAP 3.1

New York City
Historic Districts



YSDCS 1983

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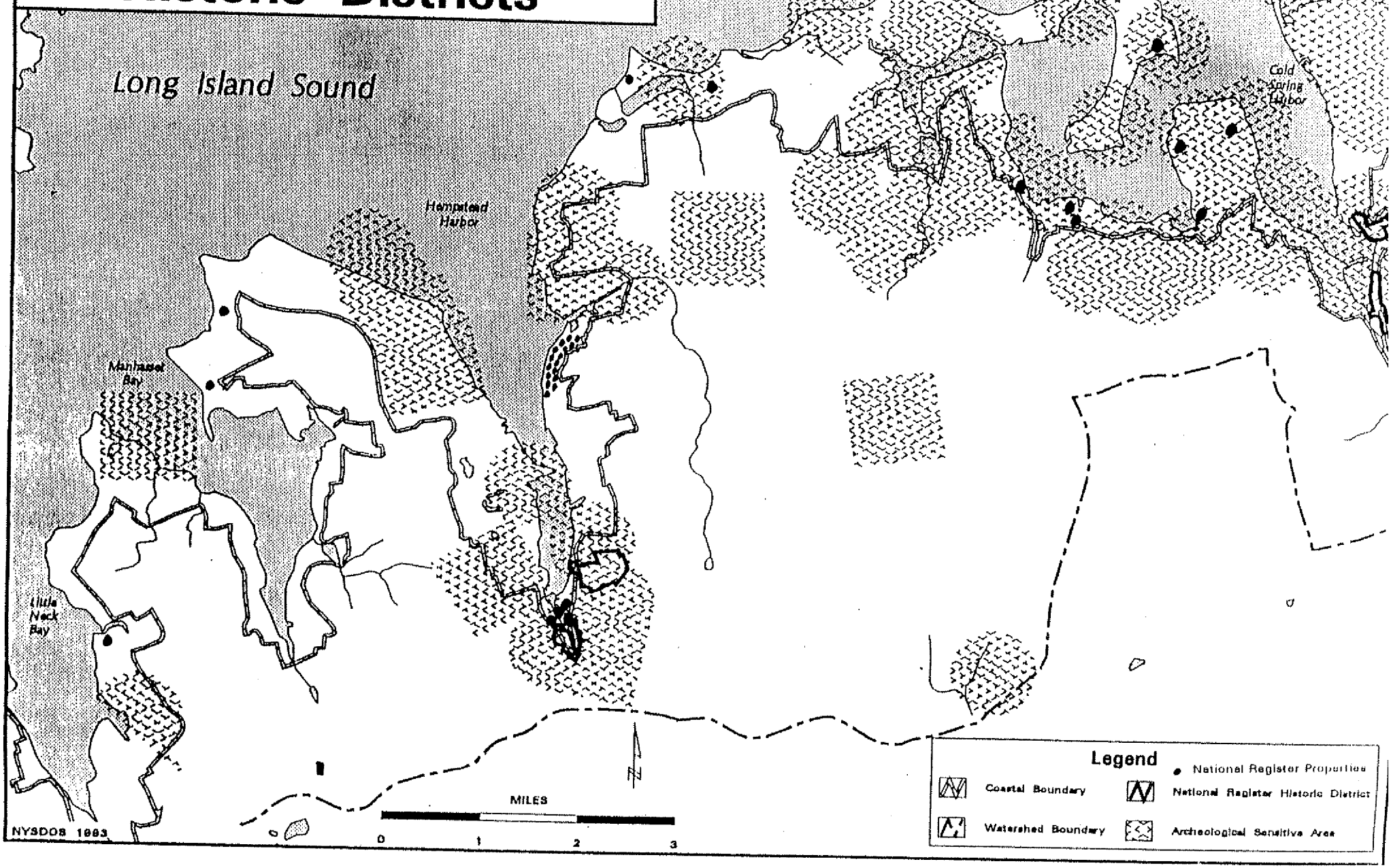
Nassau County
Historic Districts

MAP 3.2



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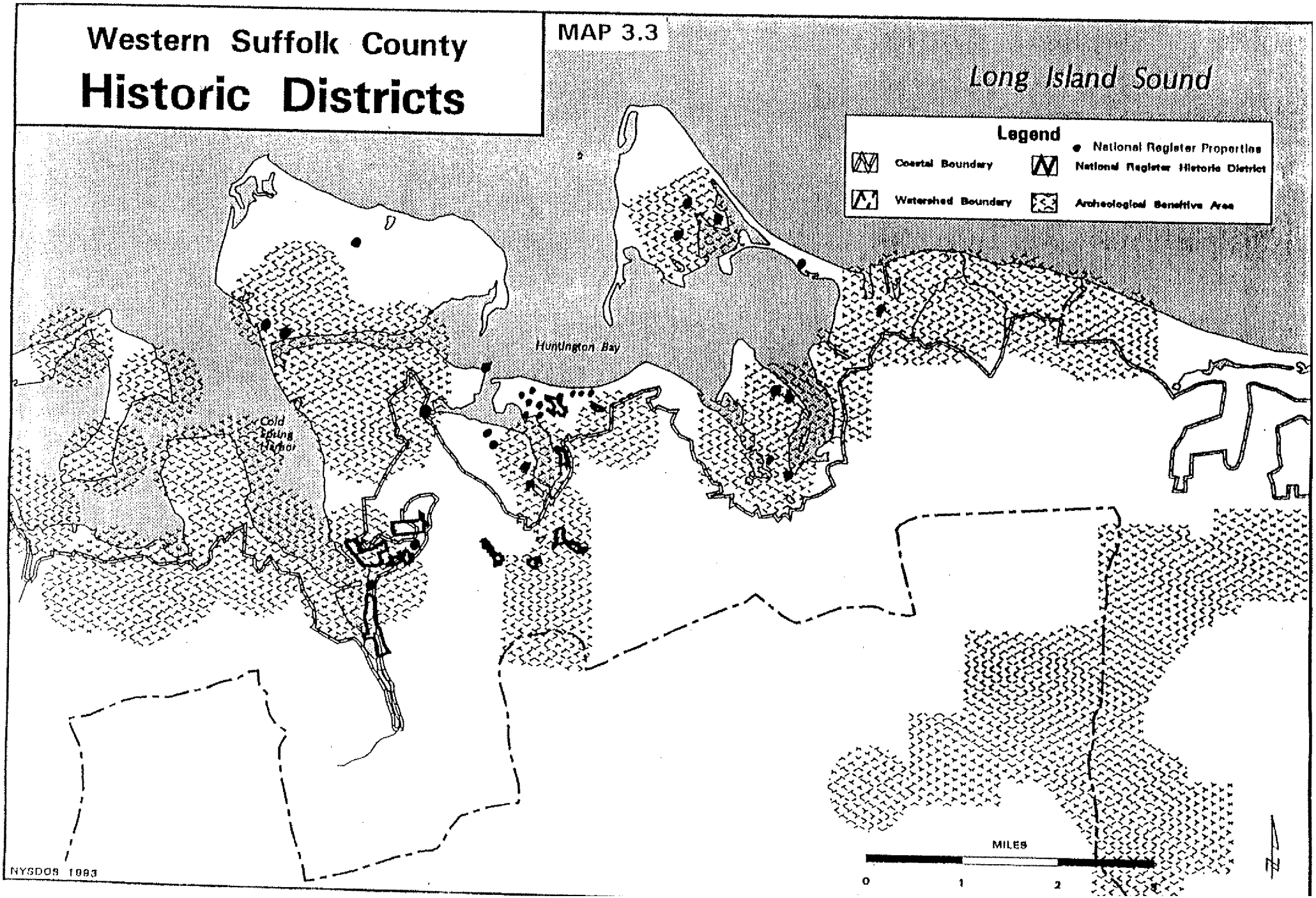
Western Suffolk County
Historic Districts

MAP 3.3



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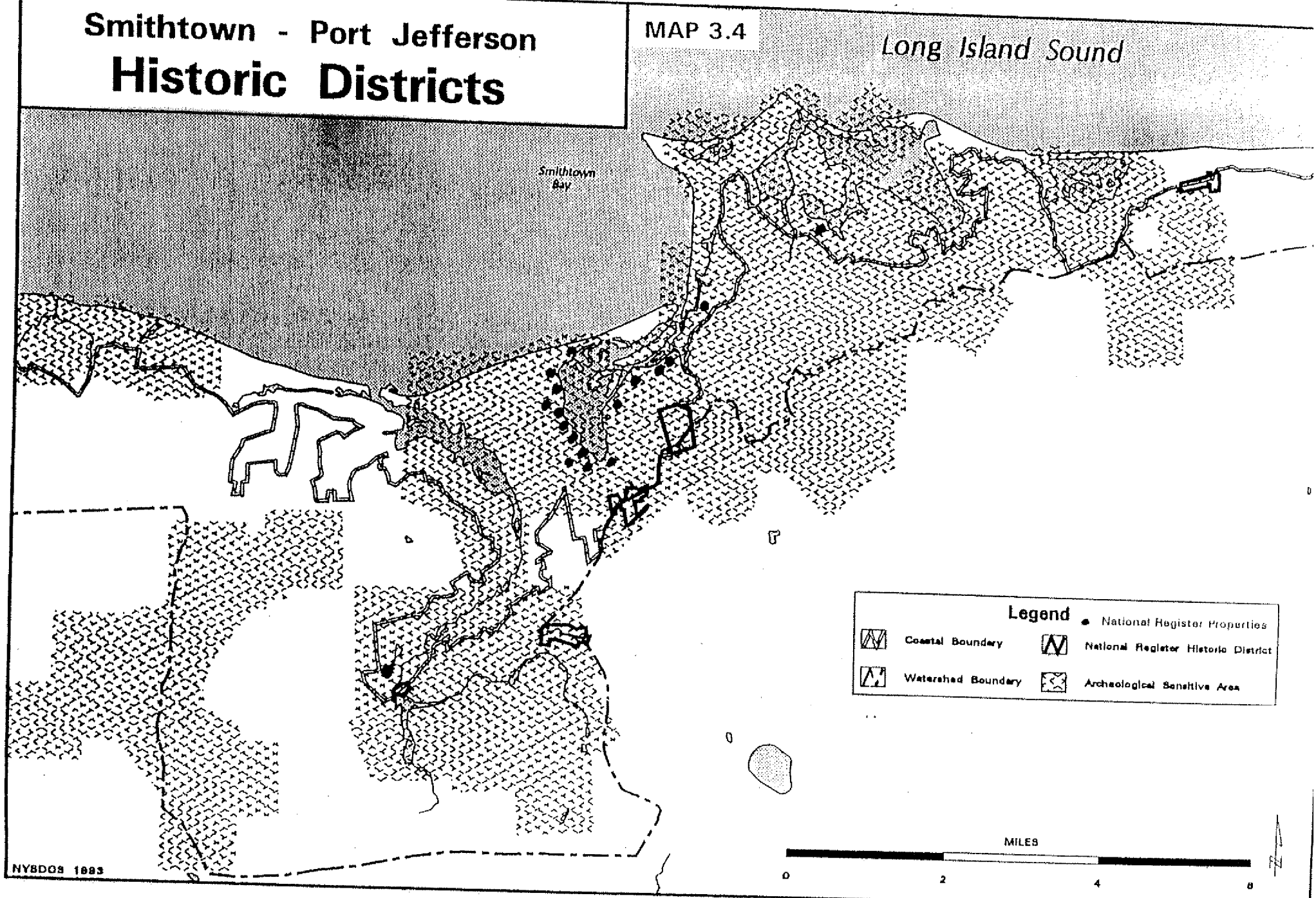
Smithtown - Port Jefferson
Historic Districts

MAP 3.4



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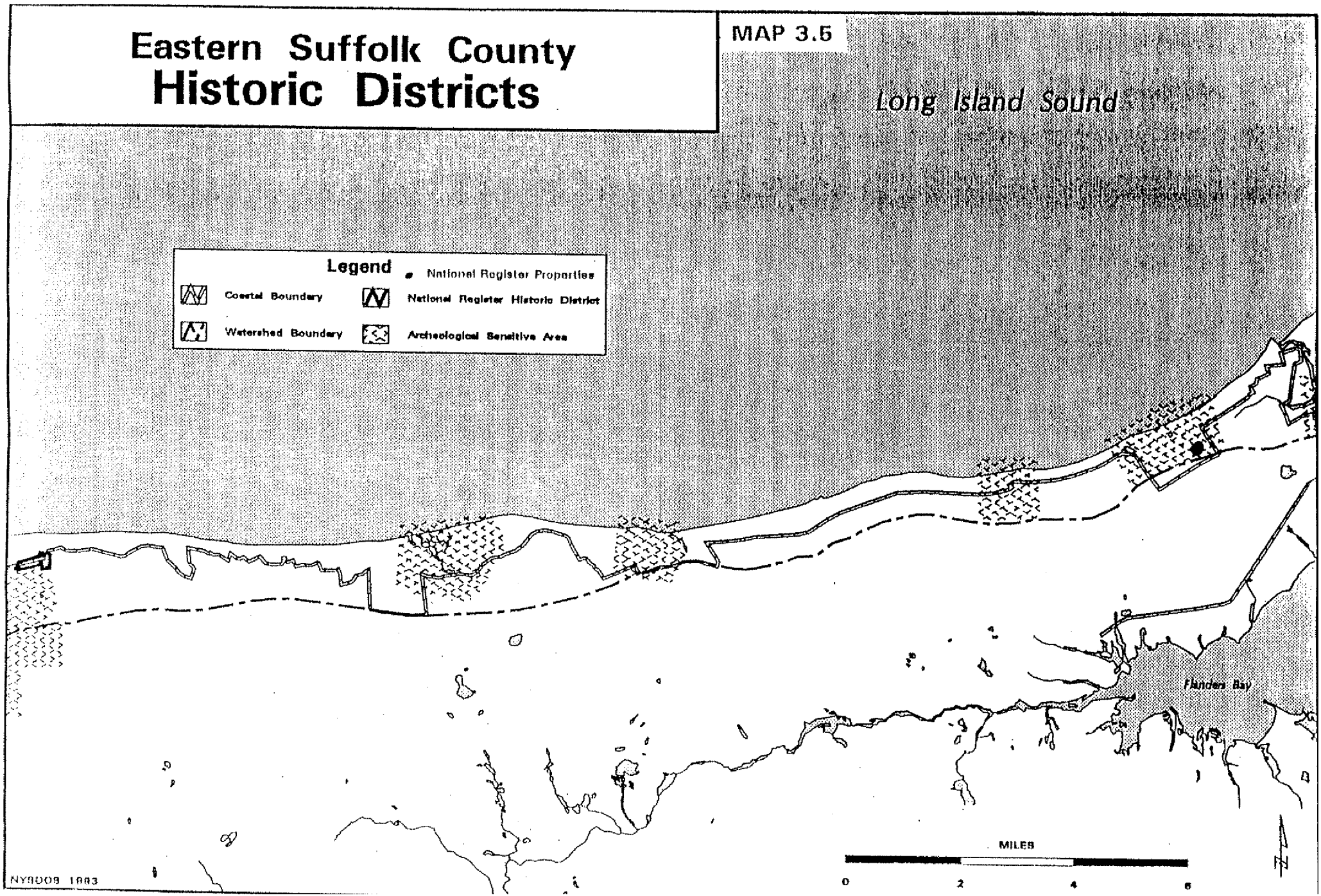
Eastern Suffolk County
Historic Districts

MAP 3.5



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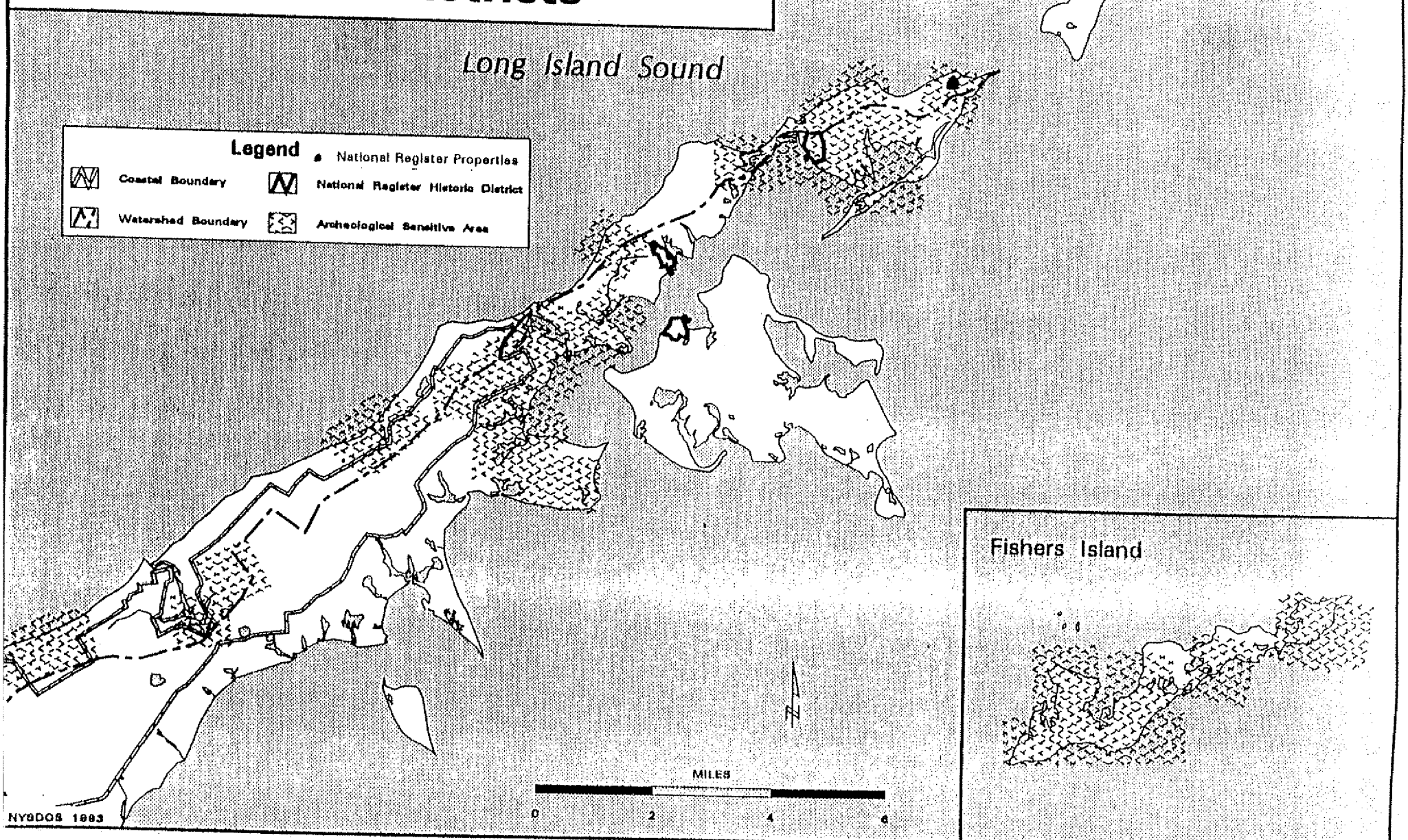
Eastern Suffolk County
Historic Districts

MAP 3.6



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In addition to the structures and districts which have received national and state recognition, there are many locally important historic resources. However, there are also many properties that have historic and architectural significance at the national, state, regional, and local level that have yet to receive the recognition they deserve or that have still to be clearly identified. All have the potential to contribute to the region's sense of place, providing continuity to human settlement of the region.

During the twentieth century, large numbers of prehistoric and historic resources in the Sound region have been lost or impaired as a result of reservoir flooding, highway expansions, and the large amount of residential, commercial, and industrial development associated with urban growth. In the past the importance of these resources was not fully understood and protection was minimal. Archaeological resources that remain today have survived more by good fortune, benefiting from the traditionally low density of development on the immediate shoreline, while historic resources and structures have survived because of happenstance, local regulation, or the commitment of the owner, be it federal, state or local government or private, to preserve the property.

The National Historic Preservation Act (1966) and the National Environmental Policy Act (1969) provided a stimulus to the protection of historic and archaeological resources, which eventually led to state and local action that ensures that the maximum consideration is given to the total environment, including archaeological and historic resources. As a result, there is an increased recognition and awareness of the significance of the archaeological and historic resources and an ever-increasing constituency for their protection.

The archaeological and historic resources of the Long Island Sound shoreline remain threatened by development, particularly from subdivision and other pressures of urban development. However, there is an increasing number of local historic preservation ordinances that seek to protect historic resources and recognize their significance in local decision-making. Some communities have architectural review laws which may result in the protection of historic architectural resources.

Protection of archaeological resources at the local level remains limited, with little in existing local laws to prevent additional losses of prehistoric and historic sites. Further development and redevelopment of any site which involves ground disturbance are likely to impact archaeological resources and only with improved local laws and review procedures which allow for examination of the site will this lead to a better understanding of the prehistory or history of the Long Island Sound shoreline.

Scenic Resources

Another major component of community character is a community's scenic resources, with special landscape features and views contributing to a community's visual character. The scenic resources of the Long Island Sound coastal region have been discussed briefly in each county overview. This highlighted the variety of physical and cultural components in the landscape and the importance of the changing land and water interface to the visual quality of the region. The lack of any significant development of any great height along the shoreline and the extensive vegetative cover, even within developed areas, were also identified as significant. It is necessary to examine these many and varied landscape components in order to evaluate the significance of the region's scenic resources and its importance to a community's sense of place.

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In recognition of the scenic value of the coast, the state Coastal Management Program provides for protection of Scenic Areas of Statewide Significance (SASS) and the general scenic quality of the coast. The Department of State has embarked on a program to identify, evaluate, and recommend areas for designation as a SASS. The department has developed a scenic assessment methodology to determine the scenic quality and aesthetic significance of the coastal area. It identifies the scenic quality of the components of coastal landscapes and evaluates them against criteria for determining aesthetic significance. The scenic assessment methodology is outlined in detail in the "Technical Memorandum: Identification of Scenic Areas of Statewide Significance in New York State" (Department of State, 1992).

To facilitate the determination of landscape quality, the landscape of the coastal area is divided into three categories of landscape components which are divided further into sub-elements of the landscape, as listed below:

Physical character:	landform, vegetation, shoreline configuration, and water features
Cultural character:	land use, ephemeral characteristics, historic character, symbolic value/meaning, architectural character, landscape character, state of upkeep, and discordant features
Views:	coastal viewshed, length of views, breadth of views, background, composition, and focal points

To determine aesthetic significance, the composition of the landscape as a whole is evaluated. All the landscape components are rated for scenic quality and are evaluated against the criteria that determine aesthetic significance. These are: (1) the variety, unity, contrast and uniqueness of scenic components; (2) the lack of discordant features in the landscape; and (3) the degree of public accessibility and recognition of a landscape. The components are then described according to three levels of quality and significance: (1) distinctive, of statewide significance; (2) noteworthy, of regional and local significance; and (3) common.

The first application of the scenic assessment methodology has been in the Hudson River Valley coastal region, where six Scenic Areas of Statewide Significance have been designated. The approach could be easily applied in the Long Island Sound coastal region, providing recognition to the landscapes of this coastal region that are of statewide significance and that are important to the community character and sense of place of the Long Island Sound.

THE SOUND COAST - A DEVELOPED COAST

The Sound coast is a developed coast, with almost all land adjacent to the Sound having been altered for some public or private purpose. While the Sound coast can be categorized as a developed coast, there are identifiable differences in the trends and pressures affecting areas of the coast. As a result, three categories of developed coast exist within the Sound. These are the stable, developing, and redeveloping coasts.

A major component of the character of a coastal community is the presence of the shoreline and, consequently, water-dependent and water-enhanced uses. Water-dependent uses are those uses that require a location in or adjacent to coastal waters or on the immediate waterfront. Water-enhanced uses are those that benefit economically from a coastal location, but do not require it for their operation, and provide for public enjoyment of the waterfront.

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Water-enhanced uses, such as restaurants or parks, often attract people to the waterfront, providing passive public access opportunities for the general public. The location of these uses has shaped and continues to shape the maritime character of coastal communities and they are found throughout the stable, developing, and redeveloping coasts.

THE STABLE COAST

The stable coast features large areas of the coast where land has been almost fully developed. It is comprised of established uses which are not expected to undergo major redevelopment. These include large areas of residential development, mixed use urban waterfronts, and areas of commercial and industrial development unrelated to the waterfront. Here, there is only gradual change through limited opportunities for infill development. However, this type of development often has significant impacts on the natural resources of the Sound, with many small-scale development and redevelopment projects having an incremental and cumulative impact throughout the stable coast.

The largest portion of the Long Island Sound coastal area can be categorized as a stable coast. This includes the whole of Westchester County, New York City, Nassau County, and the towns of Huntington, Smithtown, and Brookhaven in Suffolk County, as shown on map 4.0. Fishers Island can also be categorized as a stable coast. Opportunities exist to ensure that these areas are managed to minimize the impacts of change on coastal resources, maintaining the stable nature of large sections of the coast and ensuring the survival of community character.

One of the main threats to community character is the continued potential for subdivision of large estates, golf courses, and beach clubs. These areas are generally in private ownership and serve as a valuable economic use of the land. They also provide significant recreational amenities and important local open space resources that shape community character. Most of these areas are currently zoned for residential development, and, if developed, could result in a substantial yield of residential units. Development of these land uses will generally result an increased density of development in a community and the loss of open space.

Given the highly developed nature of the shoreline in the stable coast, there are relatively few opportunities for significantly increasing the amount and type of public access and recreation facilities along the Sound shoreline. Indeed, the development and redevelopment of small parcels of open or vacant land throughout the stable coast have led to a reduction of many informal public access points and the loss of opportunity to provide new public access points. Existing local waterfront public access points provide an important element in community character and it is important that they be protected and improved. Additional opportunities should also be identified as part of the continued small-scale development and redevelopment of the stable coast. These opportunities are discussed in more detail in chapter 3 of this volume.

Existing and new development has a serious impact on the quality of the natural coast. This is particularly intense in the densely developed areas of the stable coast. Residential, commercial, and industrial development has resulted in the deterioration of water quality and the loss, fragmentation, and impairment of many habitats and wetlands. Development on the shoreline has resulted in alterations to natural protective features and changes to the natural processes of erosion and accretion. This has led to increased erosion rates, damage by coastal storms, and tidal flooding, all of which contributes to loss of property and natural shoreline features. The limited amount of land available for development and the attractiveness of coastal locations have led to increased pressure to develop in coastal hazard

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areas, exacerbating the possibility of further resource impairments. Although the stable coast is not experiencing major changes, the many small-scale development and redevelopment projects have incremental and cumulative impacts that are significant on the natural resources of the Sound. These impacts are discussed in more detail in chapter 2 of this volume.

In the stable coast, development or redevelopment of small parcels of land often results in a change of use of an area and can lead to competition among uses for an individual parcel of land. This competition for land is most intense on the waterfront where water-dependent, water-enhanced, and non-water-dependent uses are all competing for a limited amount of developable land. For instance, a necessary and desirable water-dependent industry, such as commercial fishing, is often unable to compete economically for waterfront space with a water-enhanced use, such as a restaurant or a residential complex. The inappropriate location of uses on the waterfront can lead to the destruction of a community's sense of place and the decline of traditional waterfront uses. Often this will lead to an increase in development densities and an accompanying negative impact on adjacent land uses and an area's natural resources. Competition for waterfront uses is generally concentrated within the working waterfronts and harbor areas. These issues are discussed in more detail in chapter 4 of this volume.

The Developing Coast

The developing coast features areas of new development opportunity in previously undeveloped areas. In most cases the current use of this land is agriculture, woodland, or other open space uses. Development of these areas is often accompanied by adverse impacts on the natural resources of the coast and substantial changes in community character.

The eastern part of the Long Island Sound coastal area can be categorized as developing coast, as shown on map 4.0. This includes the towns of Riverhead and Southold in Suffolk County. The area features open agricultural and forest lands with intermittent enclaves of low and medium density residential development in hamlets and new residential subdivisions. However, current zoning allows for a wide range of residential development and, without action to protect farmland and rural character, it is likely that suburban residential growth will continue to spread east along the shoreline.

The nature of land ownership patterns, featuring large land holdings and the physical landscape of high bluffs, limits public access opportunities in the developing coast. Development of shoreline areas provides opportunities to provide public access facilities. These opportunities are discussed in more detail in chapter 3 (volume 2), The Public Coast.

Existing and new development has a serious impact on the quality of the natural coast. This is particularly evident in the developing coast. Residential development has affected water quality; led to the loss and fragmentation of wetlands, upland habitats, and agricultural land; and encroached on the bluffs. Clearing of vegetation, building, alteration of drainage patterns, and construction of erosion control structures along the bluffs have often weakened the integrity of bluffs and led to accelerated erosion of bluffs and beaches. This affects existing development, often threatening property and structures, and must be considered in any new development proposed for the land adjacent to bluffs. These issues are considered in more detail in chapter 2 (volume 2).

Competition for waterfront sites exists among water-dependent, water-enhanced, and non-water-dependent uses, but is not a major problem in the developing coast. In the Sound region, most water-dependent and water-enhanced uses are concentrated in the historic

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centers of maritime activity that exist within the stable coast. Their continued concentration in these locations is important, if the community character and sense of place of the Long Island Sound coastal region are to be maintained.

An important component in the community character of the developing coast is the working agricultural landscape. The majority of agricultural lands in the Long Island Sound coastal region are located in the developing coast. Chapter 4 (volume 2), The Working Coast, highlights both the importance of the agricultural industry in Suffolk County and the continual loss of agricultural acreage, primarily to residential development. The analysis of land available for development or redevelopment in eastern Suffolk County illustrates that this loss of agricultural land is likely to continue, as just over a third of the nearly 4,900 acres of agricultural land in the watershed area is currently zoned for residential use (see table 9).

Pressure to develop along the shoreline and adjacent coastal lands has intensified as a result of agricultural and groundwater protection efforts in inland sections of this part of Suffolk County, notably the central Pine Barrens. Various land use techniques including purchase of development rights, transfer of development rights, clustering of development, and land acquisition are being used to preserve large contiguous tracts of agricultural land and to protect the special groundwater protection areas located inland from the coast. In instances where the transfer of development rights is being used to protect land, undeveloped areas within the coastal area are being considered as receiving zones for residential development that would otherwise occur in inland areas.

The combination of these land protection efforts and current zoning patterns results in more intensive residential development near the coast and existing residential hamlets. The application of these innovative land use techniques is appropriate in the protection of agricultural land, open space, and other natural resources, and their use is necessary in the developing coast. However, their current application must be reconsidered in light of the growing development pressure that already exists within the coastal area and the impacts of this growth on the character of the coastal area, agricultural uses, service provision, water quantity and quality, the stability of the bluffs, and the natural resources of the coastal area.

The Redeveloping Coast

The redeveloping coast features areas of previously developed land, generally located within the stable coast, that are undergoing or have the potential for changes in use through redevelopment of deteriorated, abandoned, and underutilized areas. These characteristics are most often present in urbanized areas, but may also include previously developed portions of the coast which once supported coastal industry or commerce which was not within an urban area. Development within the redeveloping coast implies development in previously developed areas, where infrastructure, transportation facilities, and environmental conditions are suitable to accommodate development.

The analysis of development and land use patterns, community character, and the working coast suggests areas of the waterfront that can be categorized as redeveloping coast. These include areas of the stable coast within the Village of Port Chester, City of New Rochelle, Town of North Hempstead, Village of Manorhaven, City of Glen Cove, Town of Oyster Bay, Town of Smithtown, Village of Port Jefferson, and the Town of Brookhaven. There are also two areas that can be categorized as redeveloping coast located within the developing coast. These are at Jamesport and Mattituck Creek, in the Town of Riverhead and the Town of Southold, respectively. These areas exhibit a mix of previous uses that include sand and

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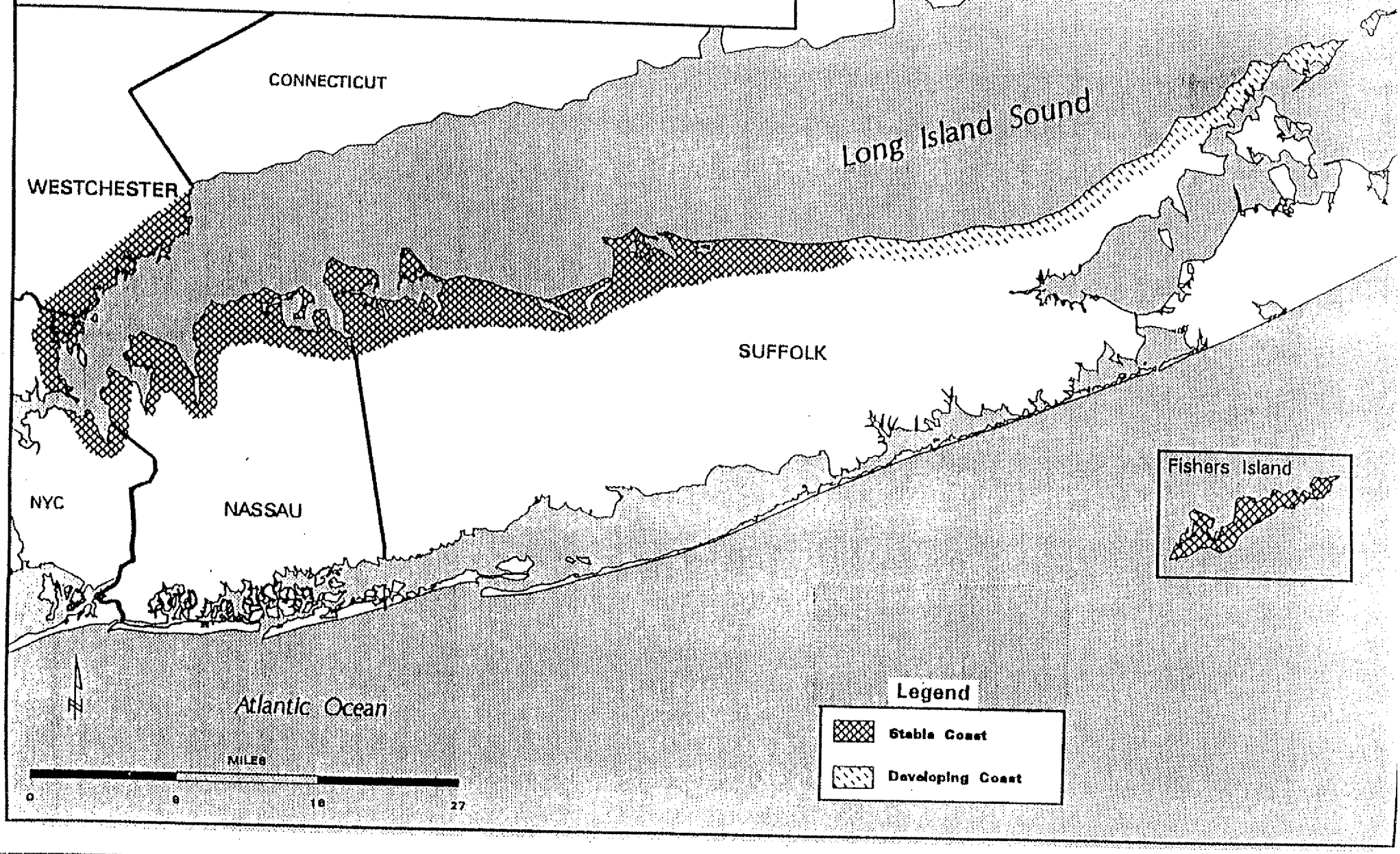
The Sound Coast

NYSDOS 1993

Map 4.0



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gravel mining, oil storage, utilities, industrial, commercial, and institutional. All areas include waterfront and adjacent upland areas.

Unplanned redevelopment can lead to competition for land between various uses and lost opportunities for public access provision, resource enhancement, and other benefits of well-designed redevelopment. As discussed in the stable coast, this competition for land has the most impact in the waterfront. Particularly significant is competition among water-dependent, water-enhanced, and non-water-dependent uses. The inappropriate location of uses on the waterfront can lead to the destruction of a community's character, the decline of traditional waterfront uses, and a negative impact on adjacent land uses and natural resources. As the redeveloping coast covers areas of land that are recognized as undergoing or having the potential for changes in use through redevelopment of deteriorated, abandoned, and underutilized areas, it is possible to plan ahead to avoid unnecessary competition for waterfront space. Careful consideration of such factors as existing uses, regional and local needs, adjacent natural resources, and community character can provide the basis for the appropriate use of the redeveloping coast.

The redeveloping coast often features large areas of waterfront where public access has been limited by past land uses. In these locations intensive industrial uses in the past have left many despoiled, deteriorated, and underutilized sites. There are opportunities for developing public access to the waterfront and other public amenities as part of any redevelopment proposals.

THE SOUND COAST - A REGIONAL WATERFRONT STRUCTURE

The Sound coast has been classified as a developed coast, categorized as either stable, redeveloping, or developing. Within this overall examination of the coast, it is possible to define a regional waterfront structure which categorizes communities in terms of function and role in the region. This structure provides for a consideration of the importance of a community and the balancing of residential, commercial, industrial, and recreational uses.

In terms of regional hierarchy, the coastal area must be placed in the wider regional setting of New York City, Westchester County, and Long Island. The influence of New York City spreads over a wide metropolitan area, making it the dominant regional center. Spread throughout the metropolitan area are a series of satellite urban centers, linked by residential suburbs with intermediate and local service centers. The satellite cities are generally located along the main transportation arteries and, apart from New Rochelle, are located inland from the shoreline. The Sound region is basically a mix of intermediate and local service centers linked by suburbs with decreasing density and increasing open space as the distance increases from New York City. The metropolitan influence is strongest in Westchester County, Nassau County, and western Suffolk County.

The regional waterfront structure of the Sound coast is based on a series of historic waterfront communities. These are communities that historically have contained concentrations of water-dependent commercial uses, relatively good land and water transportation access, and close proximity to central business districts, where commercial uses, which are complementary or supportive of water-dependent uses, can be located. There are 17 historic waterfront centers which frame the regional waterfront structure. These are:

- Village of Port Chester
- Village of Mamaroneck
- City of New Rochelle
- City Island

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- Manorhaven-Port Washington
- City of Glen Cove
- Roslyn
- Sea Cliff
- Village of Bayville
- Oyster Bay
- Cold Spring
- Huntington Harbor
- Village of Northport
- Stony Brook
- Setauket
- Village of Port Jefferson
- Mattituck Inlet

These centers have historically been the focus for growth and investment and represent the traditional harbors and commercial and industrial centers of the Long Island Sound coastal area. These centers are linked by residential communities and suburban areas which feature local, hamlet, and neighborhood centers.

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Chapter 2

The NATURAL COAST

Reclaim the value and achieve sustainable use of the Sound's natural resources by improving the quality and function of ecological systems, respecting the dynamics of shoreline change, and providing high quality coastal waters.

The Sound's natural resources—its ecological systems, dynamic shoreline features, and waters—comprise the natural coast.

A diversity of plant and animal species lives in the Long Island Sound region. Whales, seals, and sea turtles, lobster and flounder, oysters and clams, plovers and terns, beach grass, red maple, and oaks—these and many more plants and animals live in and around the Sound. All are joined through intricate ecological processes into communities ranging from upland forests and freshwater wetlands to estuaries, tidal wetlands, intertidal mudflats, and marine deepwater areas. While many species of animals stay all year in these communities, certain birds, fish, and marine mammals migrate seasonally through the region en route to locations further north and south.

Supporting the living resources of the Sound are the rolling uplands, bluffs, rocky shores, beaches, shallow embayments, and deepwater areas of the region. At the juncture of land and water, dynamic forces are constantly reshaping the shoreline features. In Westchester County, the rocky coast has resisted change for centuries; in Nassau County, the beaches and bluffs shift daily.

Water is the medium that surrounds, sustains, and molds it all.

The abundant and beautiful resources of the Sound long ago attracted human beings. The sheltered embayments that provide habitat for fish and wildlife were also desirable locations for early human settlements and more recently for villages and commercial centers. The rich soils, along with the mild climate resulting from the warming effects of the Sound's waters, were ideal for farming. More recently, the attractive environment and proximity to New York City resulted in an explosion of home building.

At first, settlers lived in relative harmony with the environment, but recent development has had more and more detrimental effects on the ecological resources and systems of the Sound. Over the past century, especially from 1950 to 1970, large-scale destruction of wetlands and terrestrial habitats was common. In that period, approximately one-third of the Sound's vegetated tidal wetlands were destroyed by filling and dredging. Laws that regulate activities in tidal wetlands have virtually arrested the loss of this habitat type, although some losses continue. Currently, one to five acres of tidal wetlands are lost annually as the result of permitted activities, with an estimated two to three additional acres lost per year to illegal development activities (Long Island Regional Planning Board, 1993). In the coastal upland, more than half of the colonial forests have been lost or fragmented, thereby threatening the continued existence of natural plant and animal communities. In many areas, landscaping has replaced indigenous plants with exotics; in turn, reducing habitat for indigenous birds and other animals.

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People have been drawn by the beauty of the Sound's shorelines. In some instances, homes have been constructed in unstable areas, often creating hazards to human life and property. Erosion control structures installed to protect private property have interrupted the natural flow of sand which replenishes beaches, exacerbating downdrift erosion problems. Buildings built too close to the edge of bluffs have accelerated slumping and erosion.

Population growth and associated development have had negative effects on the quality of water in the Sound. In urban areas, numerous point and nonpoint sources have degraded the Sound's waters. Wastewater treatment facilities, overtaxed by the large numbers of people living in concentrated areas, still discharge pollutants into the Sound, and combined storm and sanitary sewers channel untreated overflows directly into its waters. In the less developed areas of the region, diffuse pollutants—septic system effluent, lawn and agricultural chemicals, and sediments—contribute further to water quality problems.

It will cost much time and money to restore the natural coast to its former condition and to prevent more damage, but it will cost much more, especially in the quality of natural and human life around the Sound—if restorative and preventative steps are not taken. The Long Island Sound Coastal Management Program, volume 1, therefore proposes a series of recommendations to: *improve the quality and function of ecological systems, respect the dynamics of shoreline change, and require high quality coastal waters.*

THE LONG ISLAND SOUND ECOSYSTEM

Long Island Sound is a complex ecosystem consisting of physical (non-living) and biological (living) components and their interactions. The physical components include the open waters, embayments, and tributaries of the Sound, as well as coastal lowlands, headlands, bluffs, adjacent upland areas, small offshore islands, and soils. These features continue to develop and change through the action of tides and offshore currents, and through weathering by precipitation and surface runoff. The biological components include the plants and animals that make up a wide range of ecological communities in and around the Sound.

PHYSICAL COMPONENTS

New York's Long Island Sound region is part of a much larger watershed, which includes extensive areas within the states of Connecticut, Massachusetts, New Hampshire, and Vermont. Approximately 70 percent of the freshwater input to the Sound comes from this area via the Connecticut River. This fresh water mixes with salt water to create the Sound's estuarine environment.

Long Island Sound lies on the boundary between the ancient rocks of New England and the more recently formed sediments of the coastal plain that stretches along the East Coast from Florida to New York. Long Island itself was created by the forces of vast ice sheets which covered the region during two glacial advances. The retreating ice sheets left behind the geologic features, moraines, and glacial outwash deposits that dominate the topography and surface soils of Long Island today. Long Island is marked by two terminal moraines that indicate the extent of the glaciers' progress. The Ronkonkoma moraine stretches from Lake Success to Montauk and marks the southern reach of glaciation in the region. The more northerly Harbor Hill moraine extends from Brooklyn to Orient Point.

The outline of the coastline began to emerge about 20,000 years ago, as the waters of the Atlantic flowed into the breach formed by the landforms rising in the wake of the retreating

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glaciers. The present shoreline was formed in the last 3,000 years as the rise in sea level and land surface stabilized. As the shoreline began to take shape, embayments and shallows formed which supported a vast system of wetlands.

The current shoreline around Long Island Sound divides on the basis of physical characteristics into three distinct sections: the rocky shoreline of Westchester County and the Bronx; the "necks" section of Queens, Nassau, and western Suffolk counties; and the "bluffs" section of Suffolk County, which begins at Port Jefferson and extends to Orient Point on the eastern end of Long Island.

The rocky shoreline of Westchester County and the Bronx is primarily exposed bedrock, an extension of the New England coast. A major characteristic of this ancient rock is its strong resistance to erosion. Prominent examples in Westchester County are visible at Peningo Neck, Goose Island, Larchmont, and Davenport Neck near New Rochelle Harbor. The rocky coastline is covered in some areas by a thin veneer of glacial till to a depth of one to 50 meters. The rocky outcrops are interspersed with low-lying areas of salt marshes, intertidal mudflats, and small beaches. These areas are composed of fine, eroded glacial material. Historically, this shoreline had a well developed system of salt marshes. Today, however, few significant marshes remain; those that do suffer from the impacts of urban development and associated filling.

The "necks" section is located on the north slope of the Harbor Hill moraine. It is an irregular shoreline with projecting headlands, referred to as "necks," that extend northward into the Sound. Going from west to east in Nassau and Suffolk counties, they separate the following bays: Little Neck Bay, Manhasset Bay, Hempstead Harbor, Cold Spring Harbor, Huntington Bay, Northport Bay, and Port Jefferson. The bays appear to have evolved from drowned preglacial stream valleys that flowed north to an east-flowing river that would eventually become Long Island Sound.

Bluffs that front the "necks" rise to about 30 feet in the west, increasing to 75 feet and 100 feet at Lloyd Point and Nissequogue, respectively. These are composed of glacial outwash and moraine material. At the base of the bluffs are narrow beaches, spits, and bars formed from eroded bluff material, and in some areas exposures of cretaceous deposits. Examples include: the spits at Short Beach, Long Beach, West Beach, and Eatons Neck; the baymouth bar at Old Field Preserve; and the tombolo (bar connected to the mainland) at Asharoken Beach. Where sufficient material exists, sand dunes have formed on the spits, bars, and beaches. Salt marshes have also developed in the depressions behind the beaches at Stony Brook Harbor, Flax Pond, and West Meadow Beach. The western side of the projecting headlands is sheltered and therefore experiences little erosion or sedimentation. Overall, the impact of coastal processes increases eastward along the "necks," resulting in more wave-eroded bluffs, spits, and beaches as one moves from Little Neck Bay to Port Jefferson.

In the "bluffs" section from Port Jefferson and Mount Sinai east to Orient Point, the coastal terrain changes significantly. At this easternmost end of the Sound, the Harbor Hill moraine forms a gently undulating plateau. Along the north edge of the moraine is a nearly unbroken wall of coastal bluffs. The bluffs reach over 140 feet at Herod Point and flatten out to an elevation of 33 feet just west of Orient Point. Headlands extend into the Sound at Herod, Roanoke, and Horton points. At the base of the bluffs, eroded materials form narrow cobble beaches or are carried by currents along the shore. Where the bluffs are discontinuous, beaches and salt marshes have evolved.

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To the northeast of Orient Point are Plum and Fishers islands. Plum Island is a restricted, federal facility for animal disease research. Its shoreline is similar to Fishers Island. The shoreline of Fisher Island is rocky with a series of inlets, bays, sand and cobble beaches, intertidal mudflats, and salt marshes. Scattered inland are freshwater wetlands and ponds. Offshore are small, undisturbed, rock and salt marsh islands known as the Hungry Point Islands.

Biological Components

To appreciate the complexity of the Sound's living components, it is useful to recognize the region's many ecological communities, and then to understand how various ecological communities interact as ecological systems which together make up larger ecological complexes.

An ecological community can be defined as a variable assemblage of interacting plant and animal populations that share a common environment (Reschke, 1990). The ecological communities within the Long Island Sound can be categorized into the following general systems: marine, estuarine, riverine, lacustrine, palustrine, and terrestrial. Figure 1 lists examples of ecological communities within the Long Island Sound region under corresponding ecological systems. These communities differ widely. They include natural ecological communities, such as marine deepwater areas, tidal rivers, salt marshes, coastal ponds, peatlands, maritime sandy beaches and dunes, and forested uplands, as well as cultural ecological communities, such as mowed lawns with trees in suburban areas. The Long Island Sound Coastal Management Program (LIS CMP) has adopted Reschke's terminology, which differs slightly from that of the state Tidal Wetlands Act and Freshwater Wetlands Act (Environmental Conservation Law, Articles 25 and 24, respectively).

Some ecological communities, such as Atlantic white cedar swamps, constitute an entire wetland. Others, such as salt pannes, generally lie among other ecological communities that, together, comprise the whole wetland. All tidal and certain freshwater wetlands in New York State have been given special status and protection through state law. These wetlands have been recognized by the New York State Legislature as valuable resources, necessary for flood control, surface and groundwater protection, absorption of silt and organic material, flood protection, fish and wildlife habitat, open space, recreation, education, and aesthetic appreciation.

> The Tidal Wetlands Act defines tidal wetlands as including "those wetlands delineated on an inventory map and belonging to one of several classifications, namely: coastal fresh marsh; intertidal marsh; coastal shoals, bars and flats; littoral zone; high marsh or salt meadow; or formerly connected tidal wetlands." The Freshwater Wetlands Act defines freshwater wetlands as those "lands and waters of the state, as shown on the freshwater inventory map, which contain any or all of the following: (a) lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation [of listed types]; (b) lands and submerged lands containing remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, ... ; [and] (c) lands and waters substantially enclosed by aquatic or semi-aquatic vegetation . . . or by dead vegetation . . ."

In some areas of the Sound, assemblages of ecological communities make up rare ecological systems or provide particularly significant benefits to populations of fish and wildlife. These areas have been designated as Significant Coastal Fish and Wildlife Habitats (SCFWH) under the Waterfront Revitalization of Coastal Areas and Inland Waterways Act, and thus are subject to coastal consistency review provisions. These habitats are defined as geographic areas that have been determined to be

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significant in the state, based on a quantitative evaluation of a combination of ecological factors. These factors include whether the area serves one or more of the following functions:

- is essential to the survival of a large portion of a particular fish or wildlife population
- supports populations of species which are endangered, threatened, or of special concern
- supports populations having significant commercial, recreational, or educational value
- exemplifies a habitat type which is not commonly found in the state or in a coastal region

Also, the significance of certain habitats increases to the extent that they could not be replaced if destroyed.

Many nonregulated and unprotected, yet valuable, ecological communities are located in upland portions of the Long Island Sound coastal area. Among the most important are ecological communities that have been identified by the state Natural Heritage Program. The program classifies these communities according to their rarity in New York State, using the following rankings:

- Heritage State Rank of S1: typically five or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State
- Heritage State Rank S2: typically six to twenty occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State
- Heritage State Rank of S3: typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State
- Heritage State Rank S4: apparently secure in New York State
- Heritage State Rank S5: demonstrably secure in New York State
- Element Occurrence Rank: a comparative evaluation summarizing the quality, condition, viability and defensibility of the element occurrence at a site; for example, an element occurrence rank of A means that the element is an outstanding example

Because of the sensitivity of this information, it is not generally available.

Although ecological communities are identified as units, they are not discrete: Individual ecological communities are linked through geophysical, chemical, and biological characteristics with other ecological communities to form larger *ecological systems*. These ecological systems have been grouped into geographic areas termed ecological complexes. Understanding these ecological systems, and not solely their component communities, is crucial to effectively managing a region's living resources.

The delineation of ecological complexes in the Long Island Sound region was based on the information on ecological communities and habitat requirements of various species presented in the Northeast Coastal Areas Study (US Fish and Wildlife Service, 1991), the information contained in the Long Island Sound Study's "Assessment of Living Marine Resources" (NYS DEC, 1993), and the supporting narratives and maps for the Significant Coastal Fish and Wildlife Habitats. Appendix 5 contains excerpts from the Northeast Coastal Areas Study

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I. MARINE SYSTEM
- A. Marine Subtidal
  - 1. Marine deepwater community
  - 2. Marine eelgrass meadow
- B. Marine Intertidal
  - 1. Marine intertidal mudflats
  - 2. Marine intertidal gravel/sand
  - 3. Marine rocky intertidal
- C. Marine Cultural
  - 1. Marine submerged artificial structure/reef
  - 2. Marine dredge spoil shore
  - 3. Marine riprap/artificial shore

II. ESTUARINE SYSTEM
- A. Estuarine Subtidal
  - 1. Tidal river
  - 2. Tidal creek
  - 3. Brackish subtidal aquatic bed
- B. Estuarine Intertidal
  - 1. Salt shrub
  - 2. High salt marsh
  - 3. Salt pan
  - 4. Low salt marsh
  - 5. Coastal salt pond
  - 6. Brackish tidal marsh
- C. Estuarine Cultural
  - 1. Estuarine channel/artificial impoundment
  - 2. Estuarine ditch
  - 3. Estuarine impoundment marsh
  - 4. Estuarine dredge spoil shore
  - 5. Estuarine riprap/artificial shore

III. RIVERINE SYSTEM
- A. Natural Streams
  - 2. Marsh headwater stream
  - 6. Intermittent stream
  - 7. Coastal plain stream
- B. Riverine Cultural
  - 3. Ditch/artificial intermittent stream

IV. LACUSTRINE SYSTEM
- A. Natural Lakes and Ponds
  - 14. Coastal plain pond
  - 16. Eutrophic pond
- B. Lacustrine Cultural
  - 2. Cultural eutrophic lake
  - 3. Farm pond/artificial pond
  - 4. Reservoir/artificial impoundment
  - 6. Artificial pool
  - 7. Industrial cooling pond
  - 8. Sewage treatment pond

V. PALUSTRINE SYSTEM
- A. Open Mineral Soil Wetlands
  - 2. Shallow emergent marsh
  - 3. Shrub swamp
- B. Forested Mineral Soil Wetlands
  - 2. Red maple-hardwood swamp
  - 4. Vernal pool
- C. Forested Peatlands
  - 2. Coastal plain Atlantic white cedar swamp
- D. Palustrine Cultural
  - 4. Reedgrass/purple loosestrife marsh
  - 5. Dredge spoil wetland
  - 7. Water recharge basin

VI. TERRESTRIAL SYSTEM
- A. Open Uplands
  - 3. Maritime beach
  - 4. Maritime dunes
  - 5. Maritime shrubland
  - 22. Successional old field
  - 23. Successional shrubland
- B. Barrens and Woodlands
  - 21. Successional red cedar woodland
- C. Forested Uplands
  - 2. Maritime oak forest
  - 3. Maritime red cedar forest
  - 4. Pitch pine-oak forest
  - 5. Appalachian oak-hickory forest
  - 7. Chestnut oak forest
  - 8. Oak-tulip tree forest
  - 21. Successional southern hardwoods
  - 22. Successional maritime forest

Source: Adapted from Reshke, 1990

Figure 1 Ecological Communities in the Long Island Sound Coastal Area

that provide additional detail regarding identification of complexes.

The geophysical characteristics differentiating one complex from another in the Long Island Sound area include: upland topography, watersheds, shoreline configuration, underwater bathymetry, water circulation, and tidal flows. The geophysical characteristics of the uniform, generally uninterrupted bluffs at the eastern end of the Sound are distinctly different from the more complex shorelines of the Nissequogue River and western Sound areas. A primary chemical variable that distinguishes one complex from another is salinity, with the Nissequogue River delivering the greatest input of fresh water and the Eastern Bluffs Complex delivering the least to the nearshore communities of the Sound.

The biological differences among the complexes result from geophysical and chemical differences and from alterations to water bodies and the land from development. Estuarine conditions at the mouths of creeks support organisms that cannot survive in higher salinities, for example. Lowered levels of dissolved oxygen in a water body that result from eutrophication induced by human activity limit use by many organisms, and thus alter community structure. Undisturbed natural vegetation adjacent to the shore supports different species of birds and mammals than those species supported by the mowed lawns and manicured yards of suburban neighborhoods. Many resources of the Long Island Sound

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	Federal	State
Kemp's ridley sea turtle	Endangered	Endangered
Green sea turtle	Endangered	Threatened
Right whale	Endangered	Endangered
Bald eagle	Endangered	Endangered
Roseate tern	Endangered	Endangered
Perigrine falcon	Endangered	Endangered
Leatherback sea turtle	Endangered	Endangered
Piping plover (Atlantic Coast population)	Threatened	Endangered
Loggerhead turtle	Threatened	Threatened
Diamondback terrapin	Candidate for Listing	Special Concern
Least tern		Endangered
Common tern		Threatened
Northern harrier		Threatened
Osprey		Threatened
Barn owl		Special Concern
Common loon		Special Concern
Short eared owl		Special Concern
Harbor porpoise		Special Concern

Endangered: any species which meets one or more of the following criteria: (1) any native species in imminent danger of extirpation or extinction in New York, (2) any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Rules and Regulations 50 CFR 17.11

Threatened: any species which meets one or more of the following criteria: (1) any species likely to become an endangered species within the foreseeable future in New York, (2) any species listed as threatened by the United States Department of the Interior, as enumerated in the Code of Federal Rules and Regulations 50 CFR 17.11

Special concern: those species which are not yet recognized or threatened, but for which documented concern exists for their continued welfare in New York.

Categories of Endangered and Threatened species are defined in Environmental Conservation Law Section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6 NYCRR Part 182.5.

Figure 2 Status of Species Discussed in the LIS CMP

ecosystem are common to more than one ecological complex. For example, migratory fish populations, sea turtles, and seals move from one complex to another as part of their feeding and migratory patterns.

ECOLOGICAL COMPLEXES

Based on the distinguishing characteristics described above, the ecological communities of the Long Island Sound region have been determined for this plan to constitute the following seven ecological complexes:

- the **Narrows Complex**, including Westchester County, New York City, and the western bays of Nassau County
- the **Harbors Complex**, including the eastern bays of Nassau County and the western bays of Suffolk County
- the **Nissequogue River Complex**
- the **Central Bays Complex** of Suffolk County
- the **Eastern Bluffs Complex** of Suffolk County
- the **Deep, Open Water Complex** of Plum Gut and the Race

BW038013

- the **Fishers Island Complex**

The location of these complexes is shown on map 5.0. It should be noted that the line drawn around each ecological complex generally shows where the concentration of resources inventoried in the LIS CMP occurred. A major part of each ecological complex is the deeper waters of the Sound extending from the coast to the state line.

Although the ecological complexes of the Sound continue to support large and healthy assemblages of plants and animals, advancing development has destroyed, fragmented, or otherwise impaired many of the original natural communities. Development has modified the physical characteristics of shoreline and upland areas, removed food sources and cover, introduced nonindigenous species, degraded the waters of the Sound, and otherwise altered the natural environment.

Impairments to the ecological complexes of Long Island Sound can be categorized as follows:

- **Physical loss:** Immediate physical loss of elements within ecological complexes is the most obvious impact and also may be referred to as a primary impact.
- **Degradation:** Degradation of elements within ecological complexes does not refer to the outright physical loss of these elements, but rather to a negative change in the quality of these elements, caused by factors within or adjacent to a complex. This degradation usually occurs over a more extended period of time than with a physical loss and also may be referred to as a secondary impact.
- **Functional loss:** Functional loss results not from major physical changes or even from changes in the basic quality of elements within a complex, but rather from inappropriate adjacent or internal uses (homes, marinas, various recreational uses) that are disruptive to certain species of animals and cause a change or shift in their activities.

As will be seen in the detailed examination of individual ecological complexes, all three types of impairments have had and continue to have negative impacts on the Sound's natural coast. Specific existing impairments are discussed under each of the seven complexes. The following activities have the potential to impair natural resources in each of the complexes, unless otherwise noted:

Materials discharged into surface water or groundwater

- input of nutrients and contaminants, causing water pollution, from upland and in-water sources, including on-site sewage disposal systems and wastewater treatment facilities, road runoff, lawn runoff, marina facilities, recreational boats, etc.
- input of stormwater runoff resulting in sedimentation within freshwater wetlands and restricted flushing in tidal wetlands
- thermal discharges

Water intakes: installation and operation

Wetland alterations

- inappropriate and unregulated ditching, draining, and filling
- dredging of existing and new channels, which may result in alteration or destruction of benthic ecological communities, modifications to water circulation patterns, and resuspension of contaminated sediments

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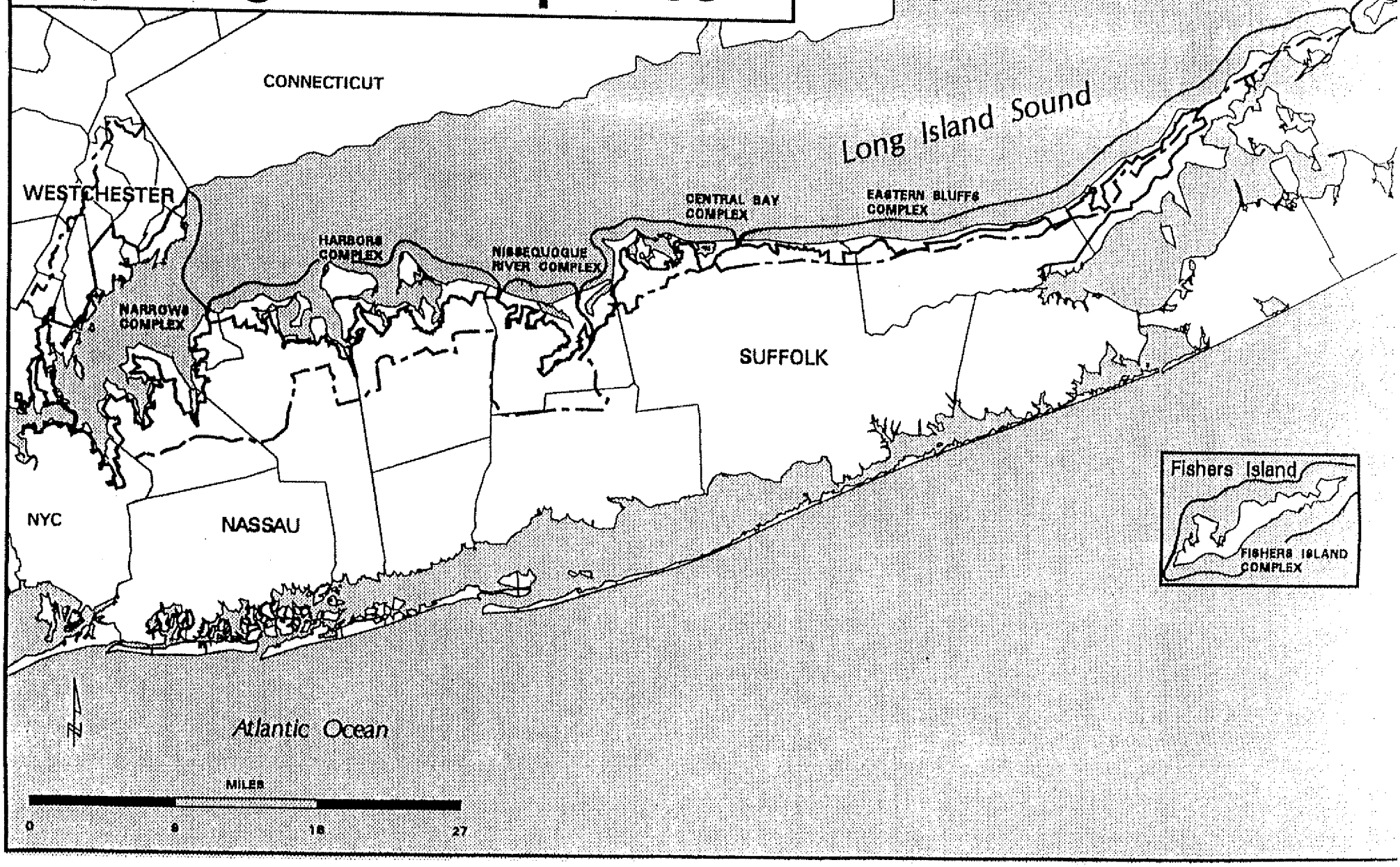
Natural Coast Ecological Complexes

MAP 5.0



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- unregulated dumping of dredge spoils
- development or removal of indigenous vegetation in wetland adjacent areas

Topographic or hydrologic alterations

- dredging of existing and new channels
- unregulated deposition of fill, spoil, or rip rap on beaches and shorelines
- alteration of soil load-bearing capacity
- construction of shoreline structures that disturb natural areas and accelerate beach and bluff erosion
- activities described above that alter tidal patterns

Alterations to natural ecological communities

- disturbance of nesting areas, notably by recreational activities, such as off-road vehicle use
- construction of residential, commercial, or industrial buildings, or other structures that eliminates contiguous, viable habitat for species that are endangered, threatened, rare, exploitably vulnerable, or of special concern
- establishment of nonindigenous invasive species in natural ecological communities resulting in loss of indigenous plant and animal habitat
- removal of indigenous vegetation resulting in fragmentation of natural ecological communities

Fragmentation of natural ecological communities into smaller, disjunct communities by development, road construction, and agriculture has profoundly reduced biological diversity and altered natural community structure throughout the seven ecological complexes. Because fragmentation is a ubiquitous problem, rather than discussing it under the individual ecological complexes in this chapter, it is examined briefly here.

The continued clearing of forests and other ecological communities for development diminishes a watershed's natural capabilities of buffering and attenuating nutrient loads and sedimentation, and thereby increases nutrient and sediment loading into surface waters, impairing water quality. Fragmentation has potentially devastating effects on wildlife species that require deep forest interior, seclusion, large home ranges or territories, and protection from nonindigenous species, such as domestic pets and Norway rats.

Forest interior species, such as the area-sensitive ovenbird, or predators requiring large home ranges may not be noticed as "absent" by people who never observed them previously, yet their loss to the overall ecosystem may cause permanent changes to overall biodiversity. As adjustments to population surges and declines occur, some species tolerant of human activity become nuisances as they make attempts at lodging, feeding, and reproducing in developed areas. Overreactions to such "invasions" place wildlife populations at further risk.

Fragmentation of natural ecological communities places at particular risk those species whose dispersal is limited by their own motility, specific habitat requirements, or the barrier of the salt water environment surrounding Long Island. Individuals that normally would repopulate areas where extirpations have occurred may not do so because of such barriers to dispersal. For such wildlife, local extirpations may lead to permanent island-wide extinctions.

The effects of landscaping with lawn grasses and other exotic plant species are somewhat insidious. As people groom their surroundings, replacing indigenous "green" areas with exotic "green" areas, less diversity in structure and food sources is available to indigenous wildlife. Habitat is being destroyed. Nonindigenous plants often do not offer adequate

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nutrition to species that did not evolve with them; moreover, people usually try to discourage wildlife from eating expensive landscape plants. This secondary effect of inadequate nutrition compounds the primary effect of physically removing structural habitat.

Imbalances resulting from fragmentation of a single large ecological community, such as a forest, can continue over a span of many decades before the complete effects on a local population are realized. With continual development, more and more habitat is lost, biodiversity decreases, and the resiliency of the ecological complex is further challenged. Where development is the most dense, remaining natural ecological communities are isolated from one another and poorly buffered from disturbance, further compromising their functions within the Long Island Sound ecosystem. Incremental loss of or impairments to tidal wetlands, for example, can have long-term effects on fisheries populations dependent upon those wetlands as nursery grounds.

THE SEVEN ECOLOGICAL COMPLEXES

This section discusses the importance of each of the seven ecological complexes. Regulated wetlands and designated SCFWHs are listed and described and their locations shown on maps 6.0-6.6.

Ecological communities not afforded some protection through protective ownership or government regulation are described in appendix 2. This unprotected category includes maritime shrubland and red cedar forests, successional maritime forests, successional old field, oak-tulip tree forests, and other natural ecological communities that serve to buffer many of the wetlands described below. In addition, these other natural ecological communities provide habitat for many species of wildlife, which adds to the biological diversity of a given complex. The role a particular site containing natural ecological communities plays in contributing to the biological diversity of a complex depends upon the proximity to wetlands and SCFWHs and upon the geophysical, chemical, and biological relationships between adjoining ecological communities. These areas may have been not designated as SCFWHs, because either documentation is lacking, the site is outside the coastal boundary, or the site has not been recently documented to reflect advantageous changes in environmental conditions. Changes, such as colonization by plants and animals, may have occurred gradually over time to sites that have been abandoned for years.

The following section also analyzes existing activities and the resulting impairments to natural resources in each complex.

The Narrows Complex

Location and Significance

The Narrows Complex is located in western Long Island Sound. It includes the Sound, its shoreline, and adjacent coastal areas in Westchester County, New York City, and western Nassau County. It stretches from the Connecticut-New York state line to Matinecock Point in Nassau County. The Narrows Complex includes two distinctive areas: the mainland shoreline of Westchester County and New York City and the western bays of Nassau County on Long Island. These two areas are joined together by the open waters of the Sound.

The Narrows Complex is well positioned along the Atlantic Flyway, a major wildlife corridor for migratory birds. During spring and fall migrations, large numbers of birds concentrate in the embayments and areas which surround offshore islands. Tributaries to these coastal embayments serve as wildlife corridors for migratory birds on a smaller scale. The sheltered

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embayments are protected from storms by rocky outcrops, the gentle slope of the intertidal shoreline, and the shallow depths. The salt marshes, intertidal mudflats, and shallows in the embayments support a diversity of shellfish and other invertebrates, a major food source for wintering waterfowl. Both resident and migratory fish thrive on these invertebrates. The large fish populations in the embayments attract heavy recreational fishing pressure.

The Westchester-New York City portion of the complex is characterized by open water, offshore islands, rocky intertidal areas, and tidal wetlands. The upland area of Huckleberry Island supports relatively large numbers of colonial waterbirds, one of only four such concentration areas in the metropolitan area, and the largest colonial waterbird rookery in western Long Island Sound. This nesting area probably accounts for many of the egrets and night herons seen in lower Westchester County and western Nassau County. Smaller islands not suitable for nesting are used as loafing areas by cormorants and gulls. These offshore islands are integral components in the larger wildlife corridor, which is the Atlantic Flyway. The rocky intertidal areas provide rich habitat for marine species and are considered rare on New York's seacoast. According to the Okeanos Ocean Research Foundation, small rock islands between Huckleberry Island and Echo Bay serve as seal haulout sites. The coastal marshes are diverse and relatively undisturbed, providing significant feeding areas for colonial waterbirds; stopover areas for migrating waterfowl, shorebirds, and raptors; and wintering areas for waterfowl. Marine finfish and shellfish also make extensive use of this area.

The Nassau County portion of the complex is characterized by open water, headlands and shallow bays, intertidal mudflats, and marshes. Migratory waterfowl winter in the area, and there are confirmed nesting sites for diamondback terrapin. Freshwater wetlands located within the drainage basins of bays contribute to the biological diversity of the complex.

Wetlands

Tidal wetlands in this complex include:

- the expansive sheltered intertidal mudflats and shallows around North Manursing Island
- the extensive littoral zone along the shoreline from Rye Beach to the Scotch Caps, comprising the rocky intertidal wetlands and salt marsh protected by Pine Island, Parsonage Point, and many rock outcrops
- the largest undisturbed tidal marsh area in Westchester County, protected by Peningo Neck and Scotch Caps, which includes Milton Harbor, the Marshlands Conservancy, Maries Neck, and Hen Island, and associated areas of Blind Brook containing salt marsh and freshwater wetland which feeds the harbor
- the two relatively undeveloped tidal creeks that feed Mamaroneck Harbor: salt marsh and intertidal mudflats fringing Otter Creek, and Guion Creek, part of Beaver Swamp Brook, which empties into the east basin of the harbor
- the shallow areas of Larchmont Harbor featuring marine intertidal mudflats and salt marsh vegetation, including the Hummocks Conservation Area
- the Premium River-Pine Brook wetland complex of Premium Point, Premium Millpond, the Premium River, and Pine Brook, which covers a diverse and relatively undeveloped complex of tidal river, intertidal mudflats, shallows, salt marsh, and freshwater wetlands

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- the small rocky islands of Echo Bay, surrounded by shallows and intertidal mudflats with areas of sparse salt marsh vegetation along its shoreline
- New Rochelle Harbor, with some salt marsh vegetation on the eastern banks of the harbor, shoreline fringe salt marsh vegetation located between piers and docking structures, and Titus Mill Pond, connected to New Rochelle Harbor, which features marine intertidal mudflats and fringing salt marsh
- in New York City, wetlands associated with Hunter Island, Pelham Bay Park, City Island, Hart Island, Rodman Neck, Hutchinson River, Eastchester Bay, Locust Point, Little Neck Bay, Alley Pond, and Udalls Cove
- in Nassau County, wetlands associated with Mitchells Creek and Sands Point

Major freshwater inputs to Long Island Sound on the Westchester County side include: the Byram River, Blind Brook, Beaver Swamp Brook, Mamaroneck River, and Premium River. These waterways have both brackish tidal marsh in their lower reaches and freshwater wetlands associated with the upland riparian corridors. The only state-regulated freshwater wetlands along the Long Island Sound shoreline of Westchester County are located at the upper reaches of Otter Creek and along Beaver Swamp Brook. However, there are numerous smaller, freshwater wetlands in the coastal area (some that are locally regulated, others that are not) which are important to water quality in tributaries and embayments and contribute to the overall biological diversity of the Narrows Complex.

In the Nassau County portion of this complex, freshwater wetlands are concentrated around the tributaries to Little Neck Bay, Manhasset Bay, Hempstead Harbor and West Pond, and Dosoris Pond.

Significant Coastal Fish and Wildlife Habitats

Eleven areas in this complex have been designated as SCFWHs by the Department of State: Playland Lake and Manursing Island Flats; Marshlands Conservancy; Premium River-Pine Brook Wetlands; Huckleberry Island; Pelham Bay Park Wetlands; Little Neck Bay; Manhasset Bay; Hempstead Harbor; Alley Pond Park; Udalls Cove; and Prospect Point.

Playland Lake and Manursing Island Flats SCFWH is located in the City of Rye. A mixture of public and private land, the area is approximately 220 acres and consists primarily of intertidal mudflats, shallow open water, limited amounts of low and high salt marsh, sand bars, and adjacent sandy maritime beach. It is one of the largest such areas on the county shoreline. Much of the habitat is in a relatively natural condition, and parts are set aside as a conservation area and nature preserve, providing access for informal nature study, environmental education, and birdwatching. The lands bordering Playland Lake and Manursing Island Flats include the heavily used Playland amusement park and predominantly low density residential areas. Although natural communities in Playland Lake have been altered by dredging, ongoing habitat disturbance is minimal.

The area is an important habitat for invertebrates and fish. Concentrations of shellfish are found throughout the area. Waterfowl use the area for feeding and refuge, especially during fall and early winter. Playland Lake and Manursing Island Flats are also used for nesting and feeding during the spring and summer by a variety of shorebirds, gulls, terns, and herons. Diamondback terrapin nested in 1987 on the sandy and grassy southern shoreline of Playland Lake.

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Marshlands Conservancy SCFHW is located on Milton Harbor in the City of Rye. The 250-acre conservancy consists of a mixture of public and private land and contains salt marsh, intertidal mudflats, shallows, mixed hardwood woodlands and forests, rocky islands, fields, and freshwater ponds. The Marshlands is a wildlife sanctuary and environmental education center operated by the Westchester County Department of Parks, Recreation, and Conservation. The land bordering the conservancy is predominantly residential, although the Rye Golf Course abuts the Marshlands on the northeast side.

The Marshlands Conservancy and its adjacent wetlands are one of the largest contiguous areas of undeveloped coastal land in southern Westchester County, including 40 acres of undisturbed salt marsh and intertidal mudflat area, the largest of its kind in the county. Upland areas support many of the region's typical species. The forests include both red maple-hardwood swamps and well-drained areas with representative plant communities. The meadow area is one of the largest remaining open field habitats in southern Westchester County.

The relatively undisturbed wetlands and uplands of the Marshlands and adjacent areas in Milton Harbor, Greenhaven Harbor, and Hen Island support a diversity and abundance of wildlife species unusual in western Long Island Sound. Many species of waterfowl, shorebirds, herons, raptors, and passerine birds use the area as nesting areas and/or a stopover during spring and fall migrations. At low tide, large concentrations of wading birds and shorebirds gather in the exposed intertidal mudflats of Milton Harbor and Greenhaven Harbor. These intertidal mudflats also provide feeding habitat for over-wintering waterfowl especially after freeze-up in other areas. Diamondback terrapin breed on marine intertidal gravel/sand spits adjoining tidal wetlands in the area. According to the Okeanos Ocean Research Foundation, hair seals use a portion of the SCFWH as a haulout site.

Premium River-Pine Brook Wetlands SCFWH is located in the Town of Mamaroneck, the City of New Rochelle, and the Village of Larchmont. This approximately 65-acre area contains a diverse and relatively undeveloped assemblage of habitat areas, unusual in the county. It includes a tidal river, marine intertidal mudflats, shallows, salt marsh, and freshwater wetlands. Several parks are part of the SCFWH. The area bordering the wetlands is predominantly moderate density residential and commercial. The wetlands support a diversity of fish and wildlife species. Local efforts are underway to preserve, maintain, and restore the wetlands.

Many species of waterfowl, shorebirds, and passerine birds nest and feed in the area as residents during the summer and also during spring and fall migrations. The area provides over-wintering habitat for waterfowl. The salt marshes, intertidal mudflats, and shallows serve as nursery and feeding areas for a variety of fish species and support concentrations of shellfish. Harbor seals are occasional visitors to the area.

Huckleberry Island SCFWH is located approximately three-quarters of a mile east of Davids Island in the City of New Rochelle. It is a wooded island with a rocky shoreline. The ten-acre island has a mostly deciduous forest with virtually no shrubs or herbaceous growth under the canopy. The island is privately owned, but development is limited to a dock and a few small buildings at the western end.

Huckleberry Island provides an undisturbed upland environment for wildlife that is rare in coastal portions of the metropolitan area. This SCFWH is used for nesting by relatively large numbers of colonial waterbirds, one of only about four such concentration areas in the

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Manhattan Hills ecological region and the largest colonial waterbird rookery in western Long Island Sound. This nesting area accounts for many of the egrets and night herons seen in lower Westchester County and on the opposite shore of Long Island. A colony of double-crested cormorants was discovered in 1986, making this area the sixth known colony in New York State. The island has nesting colonies of herring gull and great black-backed gull.

The rocky shoreline of Huckleberry Island supports a marine rocky intertidal community comprising one of the most southerly occurrences of this community type on the North Atlantic coastline.

The **Pelham Bay Park Wetlands SCFWH,** which is approximately 750 acres in area, is located in the Borough of Bronx. The habitat is centered around Pelham Bay Park, the largest municipal park in New York City, and contains extensive natural areas. Pelham Bay Park wetlands are the only relatively undisturbed tidal wetland areas remaining in the Bronx, and one of the largest natural estuarine habitats on the north shore of western Long Island Sound.

As one of the largest publicly owned natural areas in New York City, Pelham Bay Park provides valuable opportunities for fish- and wildlife-related activities. Visitors from throughout New York City and nearby areas are attracted to the park for birdwatching, photography, and informal nature study. Access to portions of the Pelham Bay Park wetlands is limited by the location of major highways and management of the park to protect ecologically sensitive areas from excessive human disturbance.

The wetlands and rocky intertidal areas of this SCFWH are inhabited by a diversity and abundance of fish and wildlife species that are unusual in the Manhattan Hills ecological region.

Pelham Bay Park wetlands provide wintering, migratory stopover, nesting, and feeding habitat for a variety of shorebirds, wading birds, waterfowl, raptors, and passerines. Recent hawk watches performed by park personnel and volunteers revealed a high number of predatory migrants including osprey, northern harrier, bald eagle, and broad-winged hawk. Red-tailed hawks, residents of the park, were also high in number. The area is also a feeding ground for birds which nest on nearby Huckleberry Island and North and South Brother Islands. In addition, marine finfish, crustaceans, and other wildlife use the waters, wetlands, and uplands of the habitat for nursery and feeding areas.

The **Little Neck Bay, Manhasset Bay, and Hempstead Harbor SCFWHs** consist of open water areas, intertidal mudflats, and adjoining salt marshes. The bays are bordered by dense residential development, extensive recreational boating facilities, and in Hempstead Harbor, by commercial and industrial development. Only a few areas of undeveloped salt marsh remain in the bays.

The bays form one of the major waterfowl wintering and migratory stopover areas on the north shore of Long Island. Marine finfish and shellfish use the bays for nursery and feeding areas. As a result of the abundant fisheries resources and their proximity to the metropolitan New York area, the bays receive heavy recreational fishing pressure. According to the Okeanos Ocean Research Foundation, the abundant fish resources also attract hair seals, which feed in the waters at the mouth of Hempstead Harbor and use nearby sites for hauling out. The bays also produce hard clams, and although none of the bay waters are certified

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for commercial shellfishing, significant numbers of young clams are removed from Little Neck and Manhasset bays for transplanting into approved waters.

The **Alley Pond Park SCFWH**, which is approximately 225 acres in area, comprises the northern half of this New York City park, which is situated at the southern end of Little Neck Bay, in the Borough of Queens. The significant habitat portion of the park includes salt marsh, intertidal mudflats, a tidal creek channel (Alley Creek), freshwater wetlands, and upland forest. The park is surrounded by dense residential and commercial development. Prior to the early 1970s, the area was subject to considerable habitat disturbance. Since then, substantial efforts have been made to restore and maintain natural habitats in the park, and facilities for environmental education and public use have been developed.

There is a diversity and abundance of fish and wildlife species in the habitat. Many shorebirds, raptors, and wading birds inhabit the area, and migrating waterfowl use it as a stopover area, with some species overwintering and nesting here. Northern harriers use the area as overwintering habitat. In addition to bird use, the area contains marine finfish, crustaceans, shellfish, and other wildlife, serving as a nursery and feeding area. Alley Pond Park contributes to the biological productivity of Little Neck Bay and adjacent marine waters.

The **Udalls Cove SCFWH** is located at the southeastern end of Little Neck Bay and is one of the last undeveloped tidal salt marshes left within the developed metropolitan New York area. It includes tidal shallows, salt marsh, and adjoining undeveloped upland areas, and features a diversity and abundance of fish and wildlife species. Most of Udalls Cove and the adjacent ravine is owned by New York State and the City of New York and managed for conservation purposes.

Many shorebirds, wading birds, and migrating waterfowl use the cove. Some species overwinter and nest in the cove. The cove contains abundant crustaceans, shellfish, and finfish. The wetlands of Udalls Cove contribute to the biological productivity of Little Neck Bay and adjacent marine waters.

Prospect Point SCFWH is located at the northern tip of Manhasset Neck. It is one of the few remaining beach and marsh ecosystems on the Long Island Sound shoreline of Nassau County and includes East Creek, a narrow barrier beach, a salt marsh, tidal flats, and open water. The habitat is bordered by a mix of undeveloped land and residential development. The nearshore waters around the mouth of East Creek receive moderate recreational fishing pressure and the area is used for waterfowl hunting. Part of the SCFWH is publicly owned.

The wetland area is a feeding and nesting area for many shorebirds, wading birds, and waterfowl, while the nearshore waters serve as an important waterfowl wintering area. Significant concentrations of least terns and common terns have been observed feeding and loafing in the area. The SCFWH is a confirmed nesting area for diamondback terrapin. Finfish, shellfish, and crustaceans are found in the waters of the SCFWH. One of the largest stands of prickly pear cactus on Long Island is found along the back side of the beach.

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Other Natural Ecological Communities

In the Narrows Complex, successional old fields and shrublands are concentrated in protected lands, such as preserves and parks. These dynamic, transitional, natural ecological communities provide habitat for many species of wildlife, sometimes best when located adjacent to other natural ecological communities and wetlands. Wildlife using successional old fields or shrublands include common garter snake, field sparrow, blue-winged warbler, mockingbird, rufous-sided towhee, American kestrel, and eastern cottontail.

Undeveloped portions of privately owned lands are dominated by cultural ecological communities, such as mowed lawns with trees, gardens, and suburban residential plantations. These replace natural ecological communities of mixed hardwood forests and various types of wetland cover.

Impairments

The Narrows Complex is located within a highly urbanized area that includes part of New York City. Relative to the other complexes, the aquatic and terrestrial resources of this complex exhibit a high degree of impairment. Residential, commercial, and industrial development have destroyed or fragmented tidal and freshwater wetlands and introduced significant levels of pollutants to the waters of the Sound.

In this complex, nutrients and contaminants from municipal wastewater treatment facilities, combined sewer overflows (CSOs), stormwater runoff, and failing on-site disposal systems all contribute to water quality problems. Many of the municipal wastewater treatment facilities are either at or above capacity. In addition, CSOs draining into the East River, the Hutchinson River, Eastchester Bay, and Alley Creek are major contributors to water quality problems. (New York City has targeted the Eastchester Bay area for significant improvement through the East River CSO Abatement Program.) Mamaroneck Harbor also receives stormwater runoff, which affects water quality in the harbor. Hempstead Harbor is affected by urban runoff. Throughout the complex, pollutant and sediment loadings, combined with restricted tidal flushing, create serious oxygen deficiencies in the summer, thereby reducing the quality of the habitat for marine life. Fish kills have resulted in some areas.

The presence of fecal coliform bacteria in the surface water precludes shellfish harvesting for direct consumption, even though shellfish are plentiful. At the heads of some embayments where there is less flushing, shellfish harvesting is permanently closed; in the more open portions of embayments where flushing is greater, shellfish can be taken for transplanting to cleaner waters.

Hazardous waste sites contaminate various water bodies in this complex. Glen Cove Creek, the location of several Superfund sites, empties into Hempstead Harbor. A federal Superfund site is located at the former Port Washington landfill on the west side of Hempstead Harbor. Continued leaching of chemicals from these sites has the potential to migrate into Hempstead Harbor and eventually into the Hempstead Harbor SCFWH. The level of contamination in the creek sediments will require special attention, if reuse of this area is to occur.

Urban stormwater runoff carrying sediments and pollutants threatens water quality in the Narrows Complex. This runoff comes from developed commercial and residential areas, roadways, construction sites, and even public parks and preserves experiencing heavy use. Stormwater may be piped directly into wetlands, as is the case with Alley Creek and Udalls Cove. In other cases, the runoff finds its way into the wetlands and waters of the complex via narrow stream channels with steep banks. The quantity and velocity of runoff in these

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channels is increased by removal of stabilizing vegetation and heavy foot traffic. This occurs in Udalls Ravine. Once the pollutants and sediments reach the wetlands and waters of the Sound, they cause a variety of problems, including polluted shellfish beds and restricted tidal circulation.

Direct filling has occurred in the complex for a variety of purposes, ranging from park and beach development to bridge construction. This construction-related filling has caused numerous problems. It has removed habitat altogether for certain species, notably shoreline nesting sites for diamondback terrapin. It has altered tidal flows or restricted tidal flushing in many of the complex's wetlands. Fill from the construction of Orchard Beach, for example, has disrupted the tidal flow in Turtle Cove, a formerly connected tidal wetland in Pelham Bay Park. Alteration of tidal circulation has occurred as well at Playland Lake, Cedar Island in Larchmont Harbor, Oakwood Island in Echo Bay, and Neptune Island and Wright Island in New Rochelle. Filling and other disturbances have also caused the vegetative composition of wetlands to change, with *Phragmites australis* and other nonindigenous species replacing indigenous species.

Construction of seawalls, revetments, and similar structures has substantially altered the natural rocky shoreline in this complex. In some cases, these activities have destroyed habitat areas such as tide pools and small pockets of sandy shoreline. Even where the shoreline profile has not been altered, natural vegetative cover of dense grasses, shrubs, and forests has been converted to lawns and ornamental plants, or removed for development and for extensive sandmining operations. Natural topography and vegetation have been severely altered for sand mining west of Hempstead Harbor. These changes destroyed upland wildlife habitat and have diminished the filtering capacity once provided by the natural shoreline, thus allowing more pollutants and sediments to enter the waters of the Sound. Nonindigenous plants and landscaping also may require intensive fertilizing and chemical pest treatment. The nutrients and pollutants from these activities eventually find their way into the Sound, thereby further degrading water quality.

Dredging to create new boat slips and mooring areas threatens remaining wetlands and shallows in this complex. Maintenance dredging of the many existing boating facilities also impairs water quality and benthic habitat, at least temporarily, by resuspending contaminated sediments. Dredging-related problems occur especially in Milton Harbor, Mamaroneck Harbor, New Rochelle Harbor, Echo Bay, the Hutchinson River, Little Neck Bay, Manhasset Bay, Hempstead Harbor, and Glen Cove Creek.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

The Harbors Complex

Location and Significance

The Harbors Complex straddles the boundary of Nassau and Suffolk counties. It stretches from Oak Neck Creek in Nassau County to Fresh Pond in Suffolk County. The complex includes a series of deep water embayments that are joined together by the open waters of the Sound. In the coastal area are headlands and bluffs, tidal and freshwater wetlands, maritime sandy beaches, maritime shrublands, oak-tulip tree forests, and chestnut oak forests. Undeveloped barrier beaches generally are rare on the north shore of Long Island, but there is one located in the complex at Eatons Neck Point.

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The complex supports a range of resident and migratory birds, fish, and other animals seeking food, shelter, and breeding habitat. It is the major waterfowl wintering and migratory stopover area on the north shore of Long Island. The bays are also used extensively used as a feeding area by shorebirds and wading birds, many of which nest in the nearby wetlands and beach areas. At one time, Sand City had one of the largest least tern colonies in the state; it still is heavily used by the species. Wintering bald eagles have been reported using the salt marsh along Mill Neck Creek, one of the few areas on Long Island where eagles have been frequently sighted during mid-winter. In addition to providing habitat for waterfowl and other birds, the bays are a productive area for marine finfish and shellfish. Oyster Bay Harbor is one of the most important oyster producing areas in the state. The complex also includes confirmed nesting areas for diamondback terrapin. According to the Okeanos Ocean Research Foundation, the bays of this complex and adjacent areas of Long Island Sound also may be an important developmental habitat for the Kemp's ridley sea turtle, especially during the late summer or early fall. The bays receive heavy recreational fishing pressure.

Wetlands

Tidal wetlands in this complex include those associated with Frost Creek, Mill Neck Creek, Goose Point, Centre Island, Lloyd Point, Lloyd Harbor, Eatons Neck, and Crab Meadow. Freshwater wetlands are concentrated around the tributaries to Frost Creek, Mill Neck Creek (Beaver Brook-Shu Swamp), Cold Spring Harbor, Huntington Harbor, Crab Meadow, and Fresh Pond.

Significant Coastal Fish and Wildlife Habitats

Ten areas in this complex have been designated as SCFWHs: the Mill Neck Creek Wetlands, Oyster Bay Harbor, Cold Spring Harbor, Lloyd Harbor, Huntington Bay, Northport Bay, Lloyd Point, Sand City, Eatons Neck Point, and Crab Meadow.

The **Mill Neck Creek Wetlands SCFWH** consists of two wetland areas, Oak Neck Creek and Beaver Lake, which are integral parts of the larger Oyster Bay Harbor ecosystem. Oak Neck Creek is a 120-acre salt marsh and tidal creek draining into Mill Neck Creek and forms one of the largest undeveloped salt marshes remaining on the north shore of Long Island. Beaver Lake, approximately 60 acres, is a privately owned freshwater impoundment which drains into Mill Neck Creek. A portion of Oak Neck Creek is within the county-owned Mill Neck Preserve. The preserve is undeveloped. It is bordered by a mix of dense residential development, large estates, and undeveloped woodlands.

The Mill Neck Creek area is a resting and feeding area for Oyster Bay Harbor's wintering waterfowl populations. Concentrations of waterfowl also occur in these areas during spring and fall migrations. Wintering bald eagles have been reported using these wetlands, one of the few areas on Long Island where eagles have been frequently sighted during mid-winter. These wetlands provide suitable nesting and feeding habitat for a wide variety of bird species. Oak Neck Creek serves as nursery and feeding habitat for various marine fish species. The area is also important as it contributes organic matter and nutrients to New York State's most significant commercial oyster beds, located in Oyster Bay Harbor.

The **Oyster Bay Harbor SCFWH** is approximately 2,500 acres in size. The SCFWH consists of the open water and wetland areas in the bay not included in the Oyster Bay National Wildlife Refuge (OBNWR). Dense residential development, bathing beaches, and

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extensive recreational boating facilities border the habitat, with only a few areas of undeveloped salt marsh remaining.

The protected harbor is one of the most important waterfowl wintering areas on the north shore of Long Island. Concentrations of waterfowl also occur during spring and fall migrations. The harbor is a highly productive area for marine finfish and shellfish, serving as a nursery and feeding area. As a result of the abundant fisheries resources in the area and their proximity to the metropolitan New York area, the harbor receives heavy recreational fishing pressure. Hard clams are abundant in the area and the harbor is also one of the most important oyster producing areas in the state. Most of the underwater lands are certified for shellfishing and leased for commercial harvest. Some recreational collecting of oysters and clams takes place in the area as well.

The **Cold Spring Harbor SCFWH** is approximately 2,500 acres in size. It consists of the open water and wetland areas in the bay that are not included in the OBNWR. The southern portion of the harbor is shallow, containing intertidal mudflats, salt marsh, and sand islands. The area is bordered by residential development, forested headlands, and extensive recreational boating facilities, with only a few areas of undeveloped salt marsh remaining.

Concentrations of waterfowl use the harbor during spring and fall migrations, and the harbor is a major waterfowl wintering area. In addition to providing nursery and feeding areas for shellfish and finfish, the harbor is also one of the few places on Long Island where smelt spawning runs are known to occur. As with Oyster Bay Harbor, Cold Spring Harbor receives heavy recreational fishing pressure. Cold Spring Harbor is also valuable as a hard clam producing area, with the northern portion of the harbor certified for commercial shellfishing.

The **SCFWHs of Lloyd Harbor**, approximately 800 acres, **Huntington Bay**, approximately 1,500 acres, and **Northport Bay**, approximately 2,200 acres, are interconnected, with Huntington Bay opening into Lloyd Harbor on the west, Northport Bay on the east, and Long Island Sound on the north. The SCFWHs consist of salt marsh, marine intertidal mudflats, and open water areas which include considerable shallow areas. The bays are bordered by residential development, undeveloped sand peninsulas, forested slopes, and extensive recreational boating facilities.

The three bays together serve as a waterfowl wintering and migratory stopover area on the north shore of Long Island. Shorebirds also use the bays for feeding, and many of these birds, including least tern, common tern, and piping plover nest at nearby Sand City and Eatons Neck Point. During the mid-1970s, least terns were reported nesting on East Beach; this area remains a valuable potential nesting site.

In addition to providing important habitat for waterfowl and other birds, the bays are a productive area for marine finfish and shellfish. The bays receive moderate recreational fishing pressure. The bays also support commercial and recreational shellfishing. According to the Okeanos Ocean Research Foundation, hair seals have been known to use areas around Northport Bay for haulout sites. The bays and adjacent areas of Long Island Sound provide important developmental habitat for the Kemp's ridley sea turtle, especially during the late summer or early fall.

The **SCFWHs of Lloyd Point, Sand City, and Eatons Neck Point** are focused on narrow, sparsely vegetated sand peninsulas, with protected salt marsh, intertidal mudflats and, in the case of the first two, small bays. Such undeveloped marine peninsula, barrier beach, and

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coastal wetland ecosystems are generally rare on the north shore of Long Island. The areas contain a diversity of fish and wildlife habitats. Most of Lloyd Point and Sand City is in public ownership, whereas Eatons Neck Point is privately owned.

All the sand peninsulas have had documented nesting sites for least terns, common terns, and piping plovers. Those which currently do not have active sites have the potential for future nesting sites. Sand City hosts some of the largest tern colonies in New York State. The protected bays, intertidal mudflats, and salt marsh areas located behind the peninsulas serve as feeding areas for the least terns and as nesting and feeding areas for many species of shorebirds, wading birds, and waterfowl. The coastal waters are also nursery and feeding grounds for finfish and shellfish important to commercial and recreational fishing in Long Island Sound. Estuarine research and education, birdwatching, and fishing are among the recreational uses of the Lloyd Point and Sand City areas.

The **Crab Meadow SCFWH** is about 300 acres in area, and consists of one of the few remaining large areas of undeveloped salt marsh on the north shore of Long Island. The vast majority of the wetland is high salt marsh. It is owned by the Town of Huntington and is bordered by undeveloped woodland, county parkland, a golf course, seasonal homes, and residential development. Despite the extent of development in the vicinity, there has been only minimal encroachment into the wetland area.

Crab Meadow provides habitat for a variety of fish and wildlife species typical of Long Island's coastal wetlands. Shorebirds, wading birds, and waterfowl feed and nest in the habitat. The salt marsh and associated tidal creeks are productive areas for finfish, shellfish, and crustaceans. An active osprey nest is located on a nesting platform in the Crab Meadow marsh.

Other Natural Ecological Communities

The Harbors Complex contains natural ecological communities which lie outside of designated SCFWH boundaries and are not within regulated wetlands or wildlife refuges, but which contribute significantly to those resource areas. An example is the former Morgan Estate, an approximately 400-acre area located on Eatons Neck in the Village of Asharoken. This privately owned property, located landward of Eatons Neck SCFWH, contains relatively undisturbed mixed hardwood forests and successional old fields. These ecological communities not only provide a buffer zone to regulated wetlands, but their proximity adds significantly to the biological diversity of the Eatons Neck SCFWH and the Sound ecosystem. They provide the upland nesting and resting habitat required by species which use the designated SCFWH for feeding.

Impairments

The Harbors Complex is less developed than the Narrows Complex and contains significant amounts of publicly owned open space. Residential development in the complex is generally low to moderate density (estates), with the exception of a few areas of high density (apartment developments). Although a large number of commercial marinas is located along the shoreline, the complex is less heavily developed with commercial and industrial uses than the Narrows Complex. The shoreline has been extensively engineered with bulkheads, groins, seawalls, piers, and docks. In Oyster Bay Harbor, long docks may contribute to fragmentation of the habitat of such species as the northern harrier, which requires open country for nesting, hunting, and winter roosting. In more inland areas, some of the forested lands bordering creeks and wetlands have been encroached upon and fragmented by large lot

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residential development. In such areas, planting of extensive lawns with horticultural varieties of trees and shrubs has replaced natural ecological communities, thereby destroying wildlife habitat.

Relative to the Narrows Complex, the Harbors Complex contains fewer buildings, roadways, bridges, and other structures bisecting portions of tidal wetlands or separating tidal wetlands from their freshwater tributaries. The presence of more forested areas and natural ecological communities provides a greater incidence of wildlife corridors and benefits established flyways.

The primary sources of declining water quality in the complex are the nutrients and contaminants from wastewater treatment facilities and on-site sewage disposal systems, nonpoint source pollution, and recreational boats that may discharge fuel, trash, or waste water. Poor water quality has forced permanent closure of shellfishing beds in portions of all of the bays in this complex. Hypoxia (oxygen deficiency) threatens fish and shellfish in the summer months. Fish kills have been recorded in the complex.

Road runoff and contaminants from upland uses reach the Sound through its tributaries. Frost Creek, for example, receives runoff from two major roads and a golf course. Removal of bank vegetation and destruction of existing vegetative buffers increase the possibility that sediments and pollutants will enter coastal waters.

Contaminated harbor sediments pose a risk in this complex. In the southern portion of the OBNWR, 1991 sampling results for copper, lead, mercury, and zinc exceeded the lowest biological effect levels suggested by NOAA. In the same year, NYS DEC sediment guidelines were exceeded for arsenic, chromium, copper, lead, mercury, and zinc. Samples taken in 1990, just below the refuge boundary and closer to the potential source of contamination, showed higher concentrations (U.S. Fish and Wildlife Service, 1993). Potential sources of these contaminants include old industrial discharges, industrial facilities, wastewater treatment plant discharges, improperly discarded hazardous wastes such as batteries and boat wastes.

Dumping and illegal fill have impaired portions of the buffer around Oak Neck Creek. This dumping, in turn, further stresses the Mill Neck Creek wetland system. Mosquito ditching throughout Crab Meadow has altered tidal circulation in this wetland. As a result, high salt marsh vegetation has replaced more biologically productive low salt marsh vegetation. Other wetlands are degraded by nutrient loadings from road surfaces and developed upland areas.

On large properties in this complex, indigenous vegetation often has been replaced with expansive lawns that lie directly behind seawalls and bulkheads. Overfertilization of lawns and excessive use of chemicals in landscaping has led to increased nutrient and chemical loading of coastal waters.

In Fort Salonga, a ditch draining Route 25A leads to freshwater wetlands associated with Fresh Pond, introducing oils, greases, and other contaminants found in road runoff. Extensive development in the Fresh Pond watershed has increased the rate of runoff funneled to this impounded water body. A section of Route 25A and properties adjacent to the Fresh Pond wetlands frequently flood after heavy rain.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

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The Nissequogue River Complex

Location and Significance

The Nissequogue River Complex extends from the headwaters of the Nissequogue River in Hauppauge to Long Island Sound at Smithtown Bay. The central portion of the bay is also included. The complex incorporates the largest river and one of the largest coastal wetland areas on the north shore of Long Island. A major impoundment of the Nissequogue River is Mill Pond in Blydenberg County Park. (Tributary wetlands in Blydenberg Park and along the East Branch are regulated by NYS DEC, but are outside the Nissequogue River SCFWH and the coastal boundary.) Almost half of the Nissequogue River Complex consists of state, county, and local parks and beaches and private preserves owned by conservation groups. The river remains in a relatively undisturbed condition and has been designated as a Scenic and Recreational River under the state Wild, Scenic and Recreational Rivers Act to encourage preservation and restoration of its natural, scenic, and recreational qualities.

The complex offers a wide diversity of fish and wildlife habitats. It contains: coastal beaches; a tidal river; salt marsh; intertidal mudflats; freshwater wetland areas, including red maple-hardwood swamps; spring-fed freshwater streams; successional southern hardwoods; and large, relatively undisturbed mixed hardwood forests at the Kings Park Psychiatric Center and in state and county parks bordering the river.

The complex provides important nesting, feeding, stopover, and wintering habitat for a variety of shorebirds, wading birds, waterfowl, and passerines. An active osprey nest has been located near Vail Pond. Short Beach is a nesting site of statewide significance for least terns, common terns, and piping plovers.

In addition, the complex is a productive area for finfish and shellfish. It supports the only sea-run brown trout fishery on Long Island Sound, with significant populations of native brook trout and stocked brook, brown, and rainbow trout inhabiting the upper freshwater segment of the river. Smithtown Bay supports significant shellfisheries. Both freshwater and salt water fish resources support heavy recreational fishing.

The complex also includes confirmed nesting areas for diamondback terrapin. Tiger salamanders have been observed at Hidden Pond Park. A high number of rare species of plants has been identified by the NYS Natural Heritage Program. These are clustered in the southern portion of the complex along the freshwater tributaries of the river (Long Island Regional Planning Board).

Wetlands

Tidal wetlands lie along Sunken Meadow Creek and the Nissequogue River north of the Route 25 river crossing in Smithtown. Freshwater wetlands are concentrated around tributaries to Sunken Meadow Creek and the main course of the Nissequogue River south of the dam near Route 25. Large expanses of freshwater wetlands, primarily red maple-hardwood swamps, extend throughout the upper reaches of the Nissequogue River.

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Significant Fish and Wildlife Habitats

Two areas in this complex have been designated as SCFWHs: the Nissequogue River and the Nissequogue Inlet Beaches.

The **Nissequogue River SCFWH** is about 750 acres in area and extends 7.6 miles from the Sound to the dam at New Millpond in Caleb Smith State Park. It covers the tidal portion of the river, including intertidal mudflats, salt marshes, and freshwater tidal marshes, bordered by mixed hardwood forest, Kings Park Psychiatric Center, and residential development. Above the Phillips Mill Dam, the river is a spring-fed, freshwater stream running through red maple-hardwood swamps and mixed hardwood forest in the state park.

The Nissequogue River provides nesting habitat for a variety of shorebirds, wading birds, waterfowl, and passerines. Many species of finfish also use the river as a nursery and feeding area. Diamondback terrapin nest along the sandy shores of the river near the mouth and use salt marshes for cover and feeding.

The **Nissequogue Inlet Beaches SCFWH** is located at the mouth of the Nissequogue River. Its 75 acres consist of two areas of relatively undeveloped barrier beach and sparsely vegetated dredge spoil on either side of the river mouth. Both areas are subject to some disturbance as a result of heavy summer recreational use.

The beaches are a nesting site for least terns, common terns, and piping plovers, particularly at Short Beach Town Park. Diamondback terrapin use both areas for feeding and cover and are confirmed nesters on the south side of the eastern spit.

Other natural ecological communities

The relatively extensive and diverse areas of protected natural ecological communities in the Nissequogue River Complex provide habitat for large numbers of fish, wildlife, and plant species. In the 543-acre Caleb Smith State Park alone, the following have been documented:

Types of Organisms	Number of Species
Ferns	21
Wildflowers	179
Shrubs	51
Trees	53
Fish	15
Amphibians	10
Reptiles	11
Birds	145
Mammals	18

These include many species that are endangered, threatened, of special concern, rare, or exploitably vulnerable.

Impairments

Much of the Nissequogue River is bordered by forested lands that have been acquired for conservation, recreational, or institutional purposes. Residential development is light, with the exception of the medium to high density residential development at San Remo. Although much of the complex is relatively undisturbed, residential development throughout the river's extensive inland watershed threatens the natural resources in the complex.

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Stormwater runoff, including roadway runoff that enters the Nissequogue River at the intersection of Routes 25 and 25A, is the most significant source of water pollution to the Nissequogue River (NYS DEC, 1991). Runoff from development sites has also introduced high levels of sediments into the river and its wetlands. Mosquito ditching at the northeast branch has directly affected portions of the river's freshwater wetlands. Failing on-site sewage disposal systems contribute to poor water quality. These water quality problems resulted in permanent closure of the Nissequogue River and nearshore areas in Smithtown Bay for shellfishing.

The river is a heavily used recreational resource. Motorized boat traffic in the shallow upper reaches of the river, north of Caleb Smith State Park, is disturbing aquatic vegetation, leading to increased erosion. Prior to passage of wetland protection legislation, the expansion of parking lots for beaches at Sunken Meadow State Park led to the filling of approximately 100 acres of tidal wetlands.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

The Central Bays Complex

Location and Significance

The Central Bays Complex is located between Stony Brook and Miller Place, from Long Beach to Mount Sinai Harbor. The complex includes the eastern portion of Smithtown Bay, Stony Brook Harbor, Port Jefferson Harbor, and Mount Sinai Harbor. These are joined together by the open waters of the Sound. The sheltered embayments of Setauket Harbor, Little Bay, and Conscience Bay are more directly connected, as they feed directly into the tidal waters of Port Jefferson Harbor.

The area is characterized by open water, headlands and bays, salt marshes and intertidal mudflats, bluffs, and coastal beaches. It contains many areas that provide valuable habitat for fish and wildlife. The complex includes large contiguous stands of mixed hardwood forests south of Mount Sinai Harbor and between Suffolk County parkland and other relatively natural private properties.

The complex is a major waterfowl wintering and migratory stopover area on the north shore of Long Island. The salt marshes, intertidal mudflats, and shallows in this area are used extensively as nesting and feeding areas by shorebirds, wading birds, waterfowl, and passerines. Least tern, common tern, and piping plover nest in several locations on the barrier beaches. The area also contains some of the largest nesting concentrations of snowy egret and black-crowned night heron on Long Island. The bays also are a productive area for marine finfish and shellfish. The area receives moderate recreational fishing pressure. The complex also includes confirmed nesting areas for diamondback terrapin. According to the Okeanos Ocean Research Foundation, the bays and adjacent areas of Long Island Sound provide an important developmental habitat for the Kemp's ridley sea turtle, especially during the late summer or early fall. The loggerhead turtle uses the adjacent waters of the Sound extensively, from Stony Brook east to Northville (in the "Eastern Bluffs" complex).

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Wetlands

Salt marshes and intertidal mudflats are found along portions of the inner perimeters of Conscience Bay, Little Bay, and Setauket Harbor. Extensive salt marsh areas exist within Stony Brook Harbor, West Meadow, Flax Pond, Conscience Bay, Little Bay, Setauket Harbor, and Mount Sinai Harbor. Mount Sinai Harbor has a significant number of salt marsh islands and extensive intertidal mudflats. Freshwater wetlands are concentrated around the tributaries to Conscience Bay and Setauket Harbor. Freshwater wetlands also are tributary to Mount Sinai Harbor and Port Jefferson Harbor.

Significant Coastal Fish and Wildlife Habitats

Six areas in this complex have been designated as SCFWHs: Stony Brook Harbor-West Meadow, Flax Pond, Conscience Bay-Little Bay-Setauket Harbor, Port Jefferson Beaches, Port Jefferson Harbor, and Mount Sinai Harbor.

The **Stony Brook Harbor-West Meadow SCFWH** covers the eastern end of the Long Beach barrier peninsula and the wetland areas behind Long Beach and West Meadow Beach. The 1,200-acre SCFWH contains extensive areas of undeveloped salt marsh, intertidal mudflats, dredge spoil islands, and open water. The bay is bordered by a mix of residential development, recreational boat facilities, and mixed hardwood forest.

Stony Brook Harbor and West Meadow Creek, together, make up one of the largest and most diverse coastal wetland ecosystems on the north shore of Long Island. Waterfowl winter in the harbor and use the area as a migratory stopover in this part of Suffolk County. The salt marshes, intertidal mudflats, and shallows in this area are used extensively as nesting and feeding areas by shorebirds, wading birds, and waterfowl. Least tern, common tern, and piping plover nest in several locations within Stony Brook Harbor. The area also contains some of the largest nesting concentrations of snowy egret and black-crowned night heron on Long Island. Stony Brook Harbor and West Meadow Creek are used by marine finfish and shellfish and by diamondback terrapin for a nursery and feeding area. Over 90 percent of Stony Brook Harbor is certified for shellfishing. According to the Okeanos Ocean Research Foundation, Kemp's ridley sea turtles have been documented in West Meadow Creek.

Flax Pond SCFWH is a relatively large, undeveloped, coastal wetland area, containing salt marsh, intertidal mudflats, shallow water areas, and portions of the barrier beach separating Flax Pond from Long Island Sound. The 150-acre area is bordered by successional maritime forest, mixed hardwood forest, and low density residential development.

The protected bay, mudflats, and salt marsh areas at Flax Pond serve as feeding and nesting areas for many migratory birds and waterfowl, shorebirds, raptors, and passerines. The barrier beach and wetlands combine to form a nesting and feeding area for least terns. Piping plovers also have been observed here. Locally significant concentrations of marine finfish, shellfish, and other wildlife are also found at Flax Pond. In addition to providing habitat, Flax Pond is an important area for coastal fisheries and shellfisheries research. The Marine Sciences Research Center of SUNY/Stony Brook operates an educational field research station at the marsh.

The **Conscience Bay-Little Bay-Setauket Harbor SCFWH** contains the largest areas of contiguous intertidal mudflats on the north shore of Long Island. The SCFWH contains about 500 acres, consisting of primarily marine intertidal mudflats with shallow open water areas, and limited amounts of salt marsh. Although much of the shoreline of Setauket Harbor has been disturbed by residential development, a considerable amount of the shoreline

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around Conscience Bay and Little Bay remains in a natural condition with pockets of salt marsh present.

Conscience Bay, Little Bay, and Setauket Harbor are used by wintering waterfowl and migratory birds. Least terns and common terns nest on Old Field Preserve. The bays are a nursery and feeding area for marine finfish and shellfish. Although most of the waters in this SCFWH are not certified for shellfishing, the greater portion of Conscience Bay sustains an active commercial shellfish harvest. According to the Okeanos Ocean Research Foundation, juvenile Kemp's ridley sea turtles and diamondback terrapins use the area. It is likely terrapins breed in Conscience Bay.

The **Port Jefferson Beaches SCFWH** consists of a relatively large area of undeveloped barrier beach. The SCFWH includes sparsely vegetated dunes, sand, pebble, and cobble beach, dredge spoil areas, formerly mined headlands, and salt marsh. The inlet to Port Jefferson Harbor has been stabilized by jetties and is maintained to accommodate ferry boat service from Port Jefferson to Bridgeport, Connecticut. The Port Jefferson Beaches SCFWH serves as an important past and potential nesting site for least terns, common terns, and piping plovers.

The **Port Jefferson Harbor SCFWH**, which is approximately 950 acres in area, consists of the open water and intertidal mudflats of the harbor. A few areas of undeveloped salt marshes exist along the perimeter of the harbor. It is bordered by undeveloped barrier beach and headlands, a power plant, residential development, and a large commercial marina.

The protected coastal bay of Port Jefferson Harbor is one of the waterfowl wintering and migratory stopover areas in this part of Suffolk County. The waters in Port Jefferson also provide habitat for marine finfish, shellfish, and crustaceans, serving as a nursery and feeding area. Most of the area is not certified for shellfishing, however. The harbor receives moderate recreational fishing pressure. According to Okeanos, the harbor and nearby parts of Long Island Sound are used by juvenile Kemp's ridley sea turtles.

Mount Sinai Harbor SCFWH, approximately 400 acres in area, is a relatively large, undeveloped, coastal wetland area, consisting of salt marsh, intertidal mudflats, and open water. The designated SCFWH excludes the heavily developed area of Cedar Beach. The bay is bordered by low density residential development and steeply sloping terrain and glacial kettle holes vegetated with mixed hardwood forest communities.

Waterfowl winter in the harbor and migratory birds use it as a stopover area. The harbor provides nesting and feeding areas for a variety of shorebirds, wading birds, waterfowl, and passerines. Most of the area is certified for shellfishing and supports recreational use of county-level significance. According to Okeanos, Mount Sinai Harbor and nearby portions of Long Island Sound serve as critical developmental habitat for juvenile Kemp's ridley sea turtles. Diamondback terrapins are likely to be breeding in the harbor.

Other Natural Ecological Communities

Other natural ecological communities in the Central Bays Complex are not regulated, but are important as wildlife habitat, as buffer zones for wetlands, and as integral components of the Sound's overall biodiversity. These communities include woodlands, maritime shrublands, chestnut oak and mixed hardwood forests, and other upland communities. A diversity of wildlife species, including eastern box turtle, great horned owl, screech owl, red tailed hawk, red-bellied woodpecker, northern bobwhite, wood thrush and many other songbird species,

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opossum, cottontail, and red fox are supported by these natural ecological communities. White-tailed deer are occasional visitors to the area.

Impairments

In the Central Bays Complex, there are varying densities of residential and commercial development, including many heavily used marinas. Significant commercial, industrial, and utility uses exist along the shoreline in the southern portions of Port Jefferson Harbor.

Nonpoint source runoff in this complex introduces sediments, coliform bacteria, pollutants from marinas, and other pollutants to surface waters, and causes poor water quality at the heads of Conscience Bay, Setauket Harbor, Port Jefferson Harbor, and Mount Sinai Harbor, where shellfish beds are permanently closed to fishing. An extensive portion of Port Jefferson Harbor is closed because of coliform loadings following rainstorms. The Setauket Mill Pond, which drains into Conscience Bay, is heavily affected by sedimentation from runoff and nutrient loadings from waterfowl. Large populations of waterfowl, particularly swans, also contribute to water quality problems in Stony Brook Harbor.

A plume of contaminants from an inactive hazardous waste site in Port Jefferson Station has migrated through groundwater into Port Jefferson Harbor. Other plumes of contaminants are moving northward in the groundwater and are likely to find their way into coastal waters of the Sound. Barge transport of petroleum to Port Jefferson Harbor poses a potential risk of an oil spill, which could threaten fish and wildlife resources in the complex.

Long docks (100+ feet) have fragmented wetlands in Port Jefferson, Conscience Bay, Setauket Harbor, and, to a lesser extent, Mount Sinai Harbor and may contribute to fragmentation of the habitat of species such as the northern harrier, which requires open country for nesting, hunting, and winter roosting.

Cottage development and attendant shoreline fortification on leased town parkland at West Meadow Beach has interrupted natural shoreline processes, altered maritime dune communities, and discouraged use by some species of wildlife.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

The Eastern Bluffs Complex

Location and Significance

The Eastern Bluffs Complex includes the Sound, its shoreline, and the adjacent upland area stretching from Miller Place to Orient Point. The area is characterized by gently curving high bluffs separated by slightly projecting headlands and tidal inlets with associated beaches, intertidal mudflats, and salt marshes. Wading River Marsh is one of the few, large areas of undeveloped salt marsh remaining on the north shore of Long Island. The presence of the high bluffs creates a physical environment that is substantially different from the western portions of the Sound shoreline. Since there are fewer freshwater streams contributing to the waters of the Sound in this complex, the nearshore salinity levels are higher.

Portions of the bluffs around Friar's Head are covered by maritime beech forest, a unique plant community on the Sound considered by the NYS Natural Heritage Program to be globally rare. The true extent of the maritime beech forest is not known, but it may stretch beyond the immediate area of Friar's Head. Large portions of the uplands consist of mixed

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hardwood forest, actively farmed land, and fields in various stages of succession. As the bluffs flatten out toward Orient Point, the Eastern Bluffs Complex follows the narrow Long Island Sound watershed. (Although it is recognized that habitat resources north and south of the watershed divide on the north fork are linked, for the purpose of the LIS CMP, the ecological communities and SCFWH south of the watershed divide are considered to be components primarily of the Peconic Bays ecosystem.)

Loggerhead and Kemp's ridley sea turtles use the nearshore waters of Long Island Sound extensively between Stony Brook Harbor and Northville. These waters now are considered important developmental habitat for juvenile Kemp's ridley sea turtles. The inlets and the waters of the Sound also provide good habitat for finfish, crustaceans, and shellfish. Green crabs, a primary food source for Kemp's ridley sea turtles, are abundant in these inlets and waters (Okeanos, 1993). The wetlands and inlets in this complex provide valuable feeding and nesting areas for a variety of shorebirds, wading birds, waterfowl, passerines, and raptors.

Wetlands

Tidal and freshwater wetlands include: Wading River, an extensive low salt marsh; Baiting Hollow, a state-owned salt marsh and beach front, and a Boy Scout camp with freshwater ponds and small areas of red maple-hardwood swamp; Iron Pier Beach, a reedgrass marsh and pond; Mattituck Inlet, with a tidal creek, salt marsh, and freshwater wetlands; Goldsmith's Inlet, a county park containing salt marsh and shallow brackish ponds used for environmental study; Great Pond, a coastal plain pond and maritime interdunal swales; Inlet Point, a county park with freshwater pond; Dam Pond, a coastal salt pond and salt marsh; and Munn Lake, a freshwater pond.

Significant Coastal Fish and Wildlife Habitats

Two areas that are wholly within this complex have been designated as SCFWH: Wading River Marsh and Mattituck Inlet. Where the bluffs flatten out toward Orient Point, there are two other SCFWHs, Orient Harbor and Long Beach Bay, which are partially within the Long Island Sound coastal area. The larger portion of each habitat falls outside the Long Island Sound coastal boundary and within the Peconic Bay system.

The **Wading River Marsh SCFWH** is about 200 acres in area and is one of the few large areas of undeveloped salt marsh remaining on the north shore of Long Island. The Wading River, a relatively large tidal creek, meanders through the marsh. The marsh is bordered by a mix of forest, permanent and seasonal residential development, a barrier spit, and the recently decommissioned Shoreham nuclear power plant.

Construction of the nuclear power plant and development of the beachside residences have resulted in some loss of salt marsh in the area. Despite these disturbances, Wading River marsh continues to provide habitat for a variety of characteristic salt marsh fish and wildlife species. The creek is closed to shellfishing, but is a productive area for marine finfish, shellfish, and crustaceans. According to the Okeanos Ocean Research Foundation, radiotelemetry has confirmed that juvenile Kemp's ridley sea turtles use the marsh. The marsh is a potential seal pupping site. Adult seals use the nearby waters of the Sound for foraging.

The **Mattituck Inlet Wetland SCFWH** is a small salt marsh and tidal creek. The wetland is undisturbed and is mostly in public ownership. The deepwater Mattituck Inlet enters Long

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Island Sound to the north of the wetland. The area is bordered by a mix of forested upland and residential and marina development.

The SCFWH supports a large variety of fish and wildlife species in the wetland and around the mouth of the inlet. Osprey have nested in the wetland and feed in the wetland and along the creek. The area also serves as an important habitat for marine finfish and shellfish, although the area is closed to shellfishing.

The **Orient Harbor SCFWH**, which is approximately 1,900 acres in area, consists of primarily the open water of the harbor. Most of the SCFWH is located to the south of the Long Island Sound watershed boundary, although Dam Pond is located within the Long Island Sound coastal boundary. The habitat is important for wintering waterfowl, osprey, diamondback terrapin, marine finfish, and shellfish. The SCFWH traditionally was one of the top scallop producing areas on Long Island and supported a commercial shellfishery significant in the northeastern United States.

The **Long Beach Bay SCFWH**, which is approximately 1,300 acres in area, includes the bay and the salt marsh and sand peninsula of Orient Beach State Park. Most of the SCFWH is located to the south of the Long Island Sound watershed boundary, although a small area of marsh is located within the Long Island Sound coastal boundary. The area features one of the largest nesting concentrations of osprey in New York and provides an important feeding, wintering, and migratory stopover area for a variety of waterfowl, seabirds, shorebirds, and wading birds. The area also provides habitat for piping plovers and least terns. Diamondback terrapin are frequently observed in the marsh. Bay scallops traditionally were abundant in Long Beach Bay and contributed to a commercial shellfishery significant in the northeastern United States.

Other Natural Ecological Communities

The areas in the Eastern Bluffs Complex covered by various hardwood forest communities provide vast acreages of wildlife habitat and east-west wildlife corridors along Long Island's north shore. Because they are remnants of even larger areas of forests that have been converted to agriculture and residences, these forest communities are of great importance to area-sensitive species, including great crested flycatcher, red-eyed vireo, wood thrush, veery, and black-and-white warbler, as well as wide-ranging birds, such as hawks and owls. Along with the habitat provided by wetlands and marine, estuarine, and intertidal communities of the Eastern Bluffs Complex, the upland, natural ecological communities from Miller Place to Orient Point contribute significantly to the overall biodiversity of the Sound ecosystem.

Impairments

The Eastern Bluffs Complex suffers those impairments associated with agricultural uses and varying densities of residential development. Concentrated development at Mattituck Inlet and Wading River Marsh, and land uses in their watersheds, have contributed to poor water quality. A significant portion of Mattituck Inlet is conditionally closed for shellfishing after rainstorms. Runoff from a parking lot, at the end of Luthers Road on the western side of Mattituck Inlet, drains directly to a beach. Wading River Marsh is also permanently closed to shellfishing.

Residential development has damaged large portions of the bluffs and landward forests. Vegetation has been cleared for views and site development. These activities expose the bluffs to direct weathering and stormwater runoff, which weakens their structure and accelerates erosion. In addition, the habitat provided by indigenous forest communities,

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including mixed hardwood forests and maritime beech forests, often is lost or fragmented through clearing for development.

The toes of the bluffs have been armored in some locations with revetments and concrete sea walls. Scouring has undermined some of the fortifications, and has threatened the stability of adjacent bluffs. These structures also interfere with transport of sand to beaches by the gravitational weathering of bluffs. Loss or reduction in width of these beaches could affect their suitability as habitat for endangered and threatened species, such as terns and plovers.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

The Deep, Open Water Complex

Location and Significance

The Deep, Open Water Complex covers the open water and islands between Orient Point and Fishers Island. This portion of the Sound is characterized by steep underwater slopes rising up to relatively shallow water shoals, creating a very turbulent tidal exchange. The salinity levels in this complex are optimal for marine finfish. These conditions are rare in New York State and provide a productive and diverse habitat for significant concentrations of fish. The shoals and deep, turbulent waters of Plum Gut and The Race provide habitat for concentrations of marine finfish. They are the major migration corridors for striped bass that move into Long Island Sound breeding grounds in spring. Plum Gut is also thought to be a major corridor for Atlantic salmon returning to the Connecticut and Pawtucket Rivers in the early spring. Because of these abundant fishery resources, these areas are nationally renowned for recreational fishing. In addition, the commercial trap net and lobster fisheries in this complex are of regional significance. Right whales, harbor porpoises, hair seals, and Kemp's ridley sea turtles frequent the deep waters in and around the complex. The complex provides important developmental habitat for juvenile Kemp's ridley sea turtles.

The complex also includes Plum Island, a large offshore island to the east of Orient Point, which contains beaches backed by a variety of maritime dunes, mixed hardwood forests, lowlands with freshwater ponds, and freshwater marshes. Offshore rocks support marine rocky intertidal communities. The upland, mixed hardwood forest community on Plum Island supports a black-crowned night heron rookery. Little Gull and Great Gull Islands are two small rocky islands to the east of Plum Island that are of national significance for their populations of common tern and roseate tern. The roseate tern colony is the second largest in North America. Isolation from human activities provided by these islands and the abundant fish resources of the surrounding waters make them suitable for use as seal haulout areas (Okeanos, 1993). The Animal Disease Center of the U.S. Department of Agriculture is located on Plum Island.

Significant Coastal Fish and Wildlife Habitats

Two areas in this complex have been designated as SCFWHs: Plum Gut and The Race.

The **Plum Gut SCFWH**, about 500 acres of open water, is located between Orient Point and Plum Island. The SCFWH is a channel over 60 feet deep and approximately one-half mile across, bordered by steep underwater slopes rising up to the relatively shallow Midway Shoal. It is the primary opening in the underwater ridge separating Long Island Sound and Gardiners Bay.

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The Race SCFWH is about 2,500 acres in area. It is an area of open water between Race Point, at the western end of Fishers Island, and Valiant Rock, located approximately one and one-half miles southwest of Fishers Island. The SCFWH is a channel over 150 feet deep and approximately one mile wide, bordered by steep underwater slopes rising up to relatively shallow water on each side. It is the primary opening in the underwater ridge separating Long Island Sound and Block Island Sound and is an area of very turbulent tidal exchange.

Impairments

The Deep, Open Water complex represents some of the most pristine water areas of the Sound. There is great recreational fishing pressure in this area, and without appropriate monitoring and management, overfishing may affect certain species. Existing fisheries management programs should continue and be strengthened. Any activity that would alter the water currents in this area would have a significant impact on the natural values of the complex. Activities on Plum, Little Gull, and Great Gull islands, as well as on Fishers Island and the west end of Long Island, could potentially affect the waters of the Deep, Open Water Complex. Boat traffic close to seal haulout areas could interfere with continued use (Okeanos, 1993).

In addition to the above activities causing impairments, there are a variety of other shoreline and upland activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

The Fishers Island Complex

Location and Significance

The Fishers Island Complex is located off the eastern tip of the North Fork of Long Island, separated from the mainland by The Race and Plum Gut. The entire island and associated nearshore areas are included within the complex. The island is surrounded by the highest quality marine waters in the Sound region. A wide variety of ecological communities exists on and around the island. Along the shore are coastal salt ponds, brackish and salt marshes, a sheltered bay and coves, maritime sandy beaches, rocky intertidal communities, and small offshore islands. Inland areas of the island host freshwater ponds, coastal plain pond shores (rare), shrub swamps, red maple-hardwood swamps, oak-hickory forests, a maritime beech forest (globally rare), other forested areas which help protect the island's water supply and prevent invasion of exotic species, shrub thickets, and managed maritime grasslands (fire-maintained).

Many of the island's rare species are concentrated in wetlands. River otter and mink have been observed in freshwater ponds. Fishers Island contains a significant number of rare, endangered, or threatened species of plants and animals. According to the Draft Fishers Island Water Supply and Watershed Study, Ecological Component, about 45 species of plants listed as rare, endangered, or threatened are found on the island, as are over 90 breeding bird species, including osprey, fish crow, and at least eight other protected species. The beach areas are used by many varieties of sea birds, wading birds, waterfowl, shorebirds, and passerines. Nesting sites for least tern, common tern, piping plover, and osprey have been identified. There are gull rookeries on the offshore rocks. The small, undeveloped group of islands off the north shore hosts one of the largest nesting concentrations of double-crested cormorants in New York State. Seals in the hair seal family concentrate in the area during the winter months, using exposed rocks and small islands for haulout sites.

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Wetlands

Fishers Island contains approximately 420 acres of wetlands, 98 acres of which are regulated by New York State. Tidal wetlands border the inlets and bays, and include intertidal mudflats and salt marshes, as well as rocky intertidal communities on the offshore rocks. Brackish marsh, shrub swamps, and red maple-hardwood swamps are located in the inland portions of the island.

Significant Coastal Fish and Wildlife Habitats

There are two areas on Fishers Island designated as SCFWHs: Fishers Island Beaches and Hungry Point Islands.

The **Fishers Island Beaches SCFWH** consists of the Mud Pond Beach area, about eight acres on Fishers Island Sound, the Middle Farms Beach area (17 acres) on Block Island Sound, and the Stone Beach area, a ten-acre spit dividing Hay Harbor and Fishers Island Sound. These undeveloped beaches consist of a mix of sand, gravel, and pebbles. The Mud Pond Beach and Middle Farms Beach areas experience some human disturbance.

The beaches are small segments of undeveloped sand and pebble beaches that are part of a network of potential bird nesting sites. Least terns have nested at Mud Pond Beach and Middle Farms Beach, common terns have nested at Stone Beach, and least tern and piping plover have nested at Middle Farms Beach. Osprey have nested adjacent to Middle Farms Beach and Mud Pond Beach. There are gull rookeries on the rocks offshore of all three of these beach areas, most predominantly near Hay Harbor. The gulls are thought to be the major deterrent to nesting of terns and plovers on these beaches. The beach areas are also used by many varieties of sea birds, wading birds, waterfowl, shorebirds, and passerines.

The **Hungry Point Islands SCFWH** is located along the north shore of Fishers Island. The SCFWH is a group of small, undeveloped islands, each less than three acres in size, consisting almost entirely of exposed rock, small clumps of trees, and salt marsh. They form a coastal habitat for several unusual species of wildlife and are isolated from predators and human disturbance, which distinguishes this area from many other rock and marsh islands in Suffolk County.

Pine Island, the largest island, provides nesting sites for concentrations of double-crested cormorants. In the 1990–1991 Long Island Colonial Waterbird and Piping Plover Survey, between 560 and 600 pairs of double-crested cormorants were surveyed on the three islets at Hungry Point. Nesting colonies of great black-backed gulls and herring gulls also occupy the islands. Harbor seals regularly use the exposed rocks as haulout sites during the winter months.

Other Natural Ecological Communities

Oak forests, oak-hickory forests, shrub thickets, and marine scrublands are the most prevalent unregulated upland natural ecological communities on Fishers Island. The forests are large enough to host area-sensitive species, such as ovenbird and red-eyed vireo, and provide breeding habitat for black-crowned night heron, and, possibly, barn owl. Redback salamander and black racer have been observed in the oak-hickory forests, as well as two rare sedges. Shrub thickets provide breeding habitat for snowy egret, gadwall, and northern harrier, among many other species. One such thicket hosts seaside angelica, a rare plant. A maritime grassland community on the island provides habitat for osprey and two rare plant species. Although several common mainland species, such as toads, chipmunks, and

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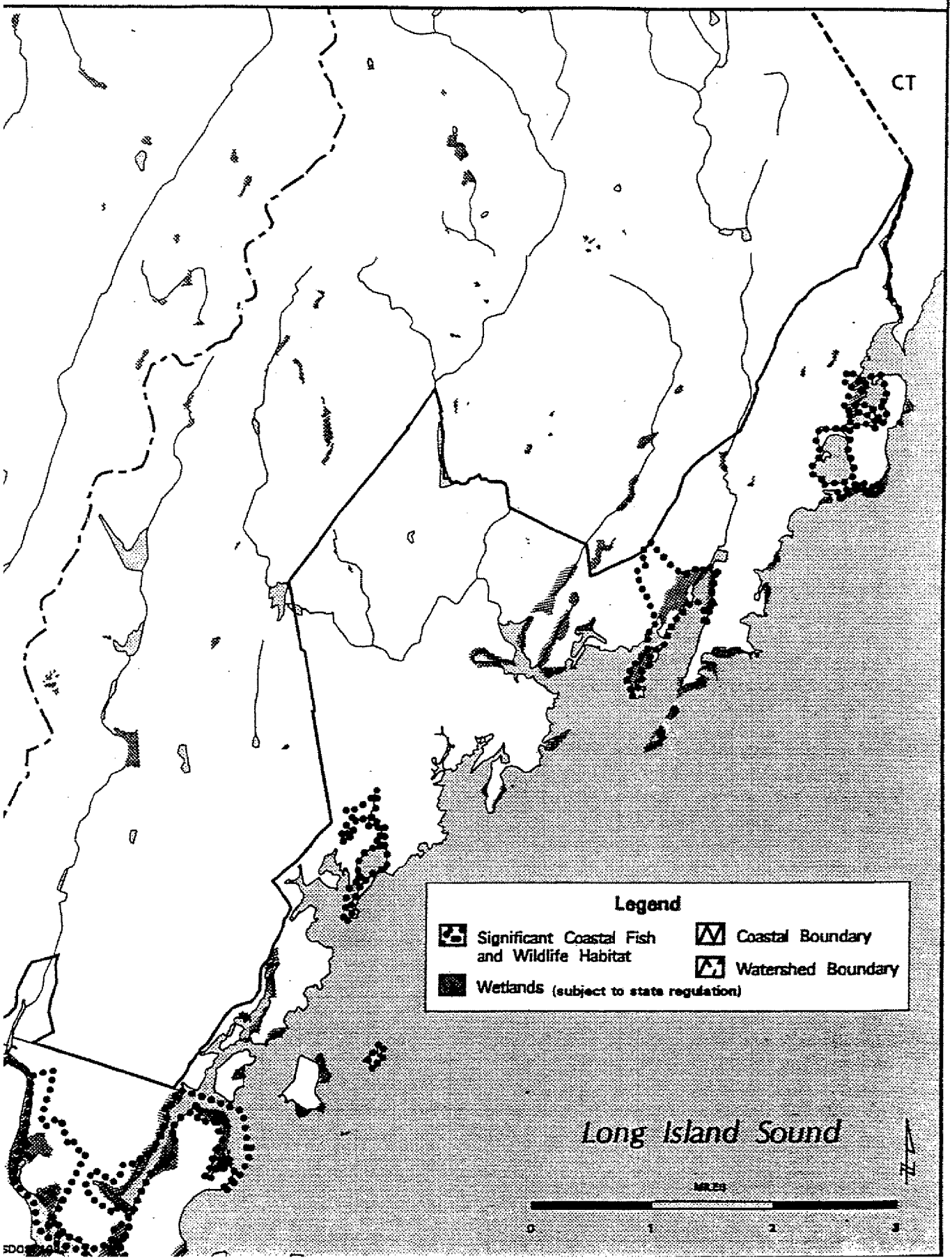
MAP 6.0

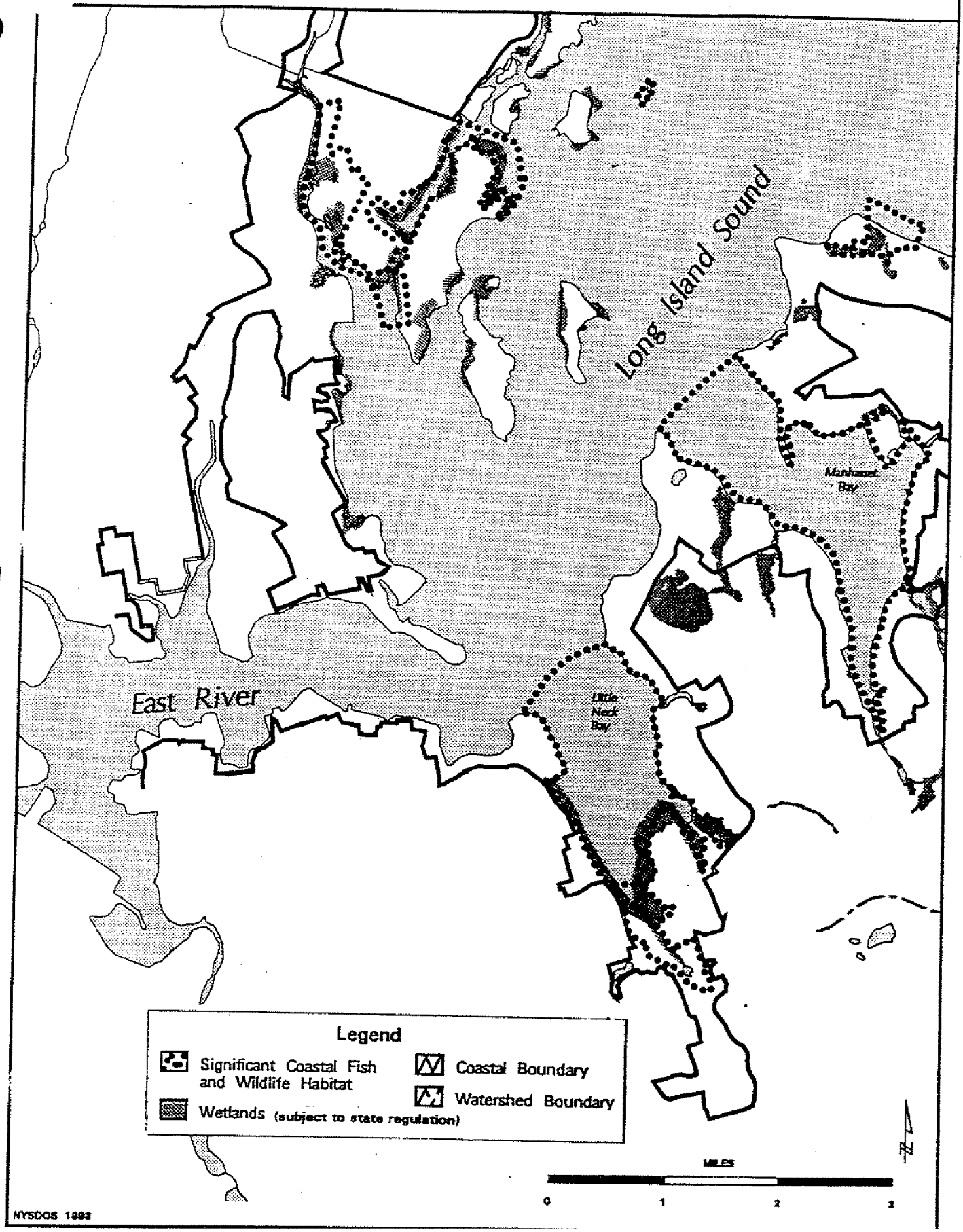
Westchester County
Wetlands and Habitats



BW038040

MAP 6.1

New York City
Wetlands and Habitats



NYSDOS 1992

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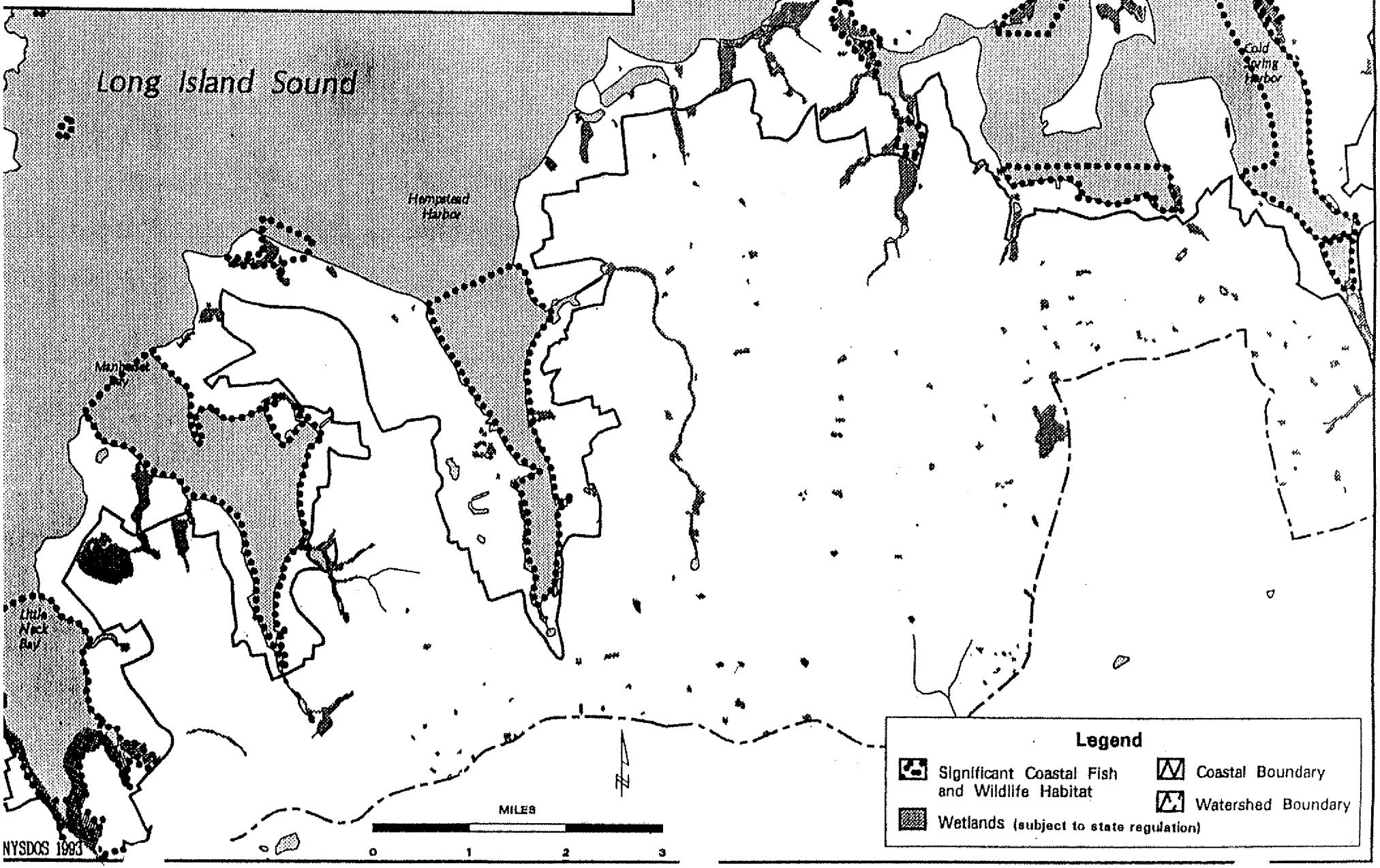
Nassau County Wetlands and Habitats

MAP 6.2



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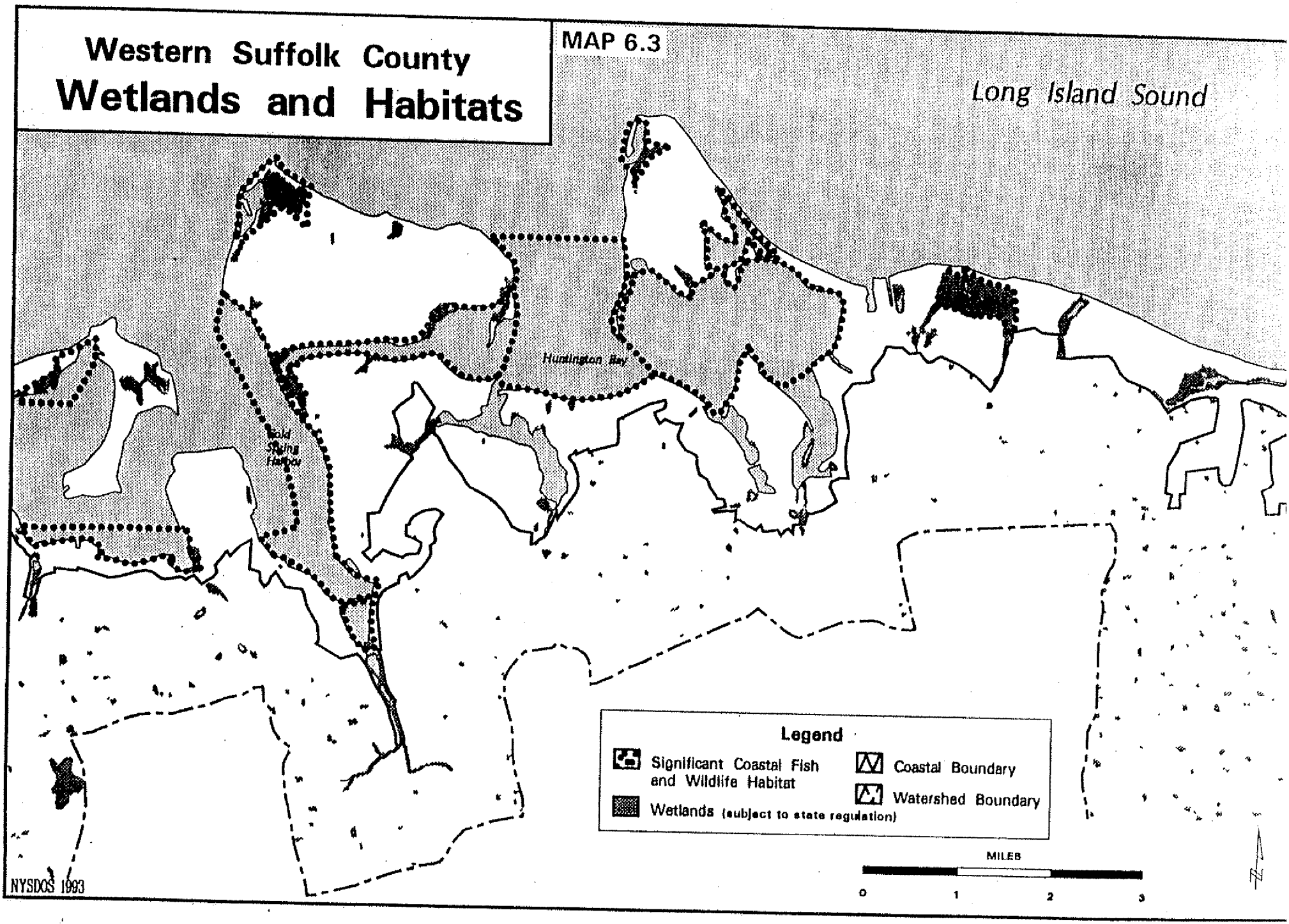
Western Suffolk County
Wetlands and Habitats
MAP 6.3
Long Island Sound
Huntington Bay
Legend
Significant Coastal Fish and Wildlife Habitat
Wetlands (subject to state regulation)
Coastal Boundary
Watershed Boundary
MILES
0
1
2
3
NYSDOS 1993

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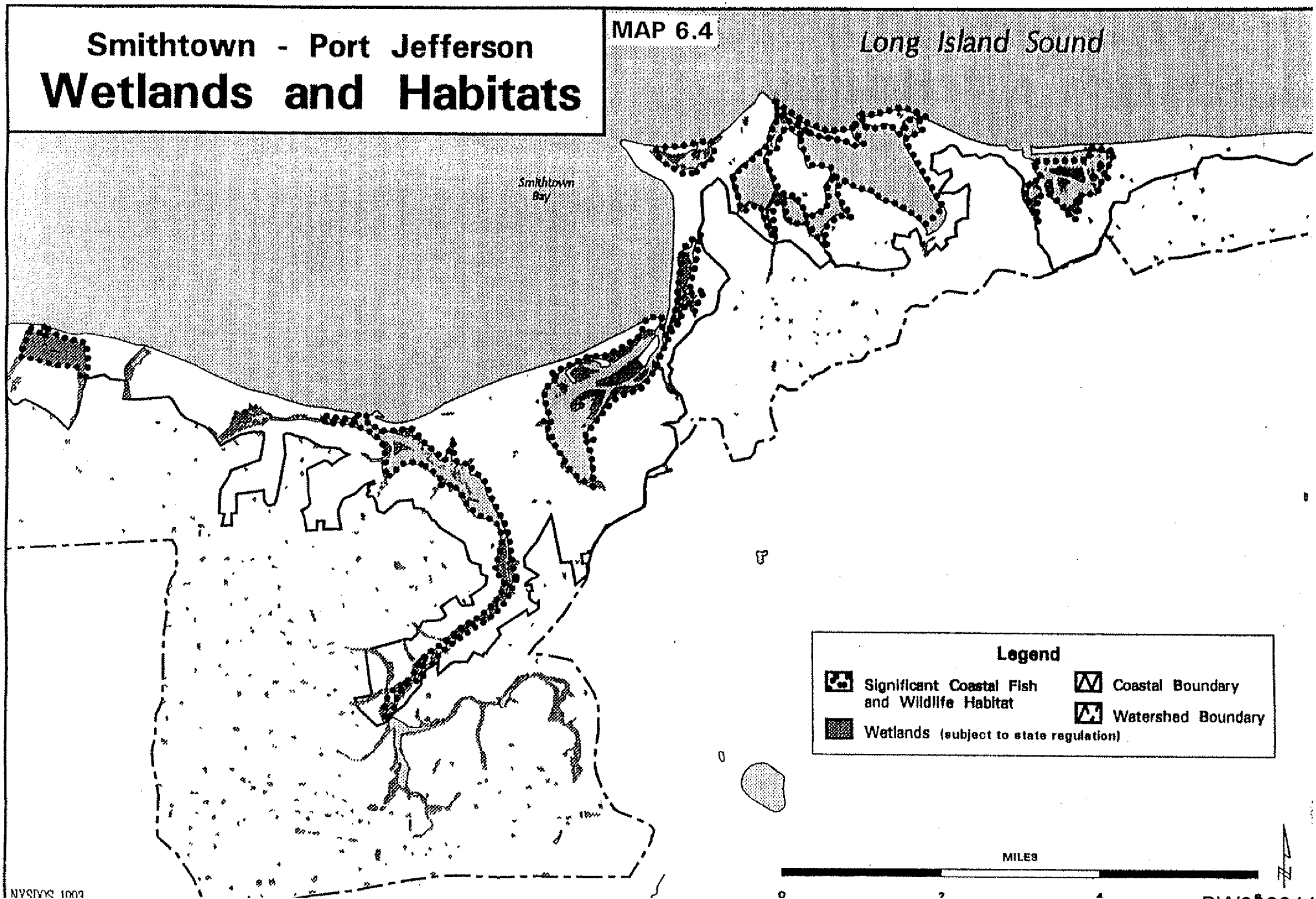
Smithtown - Port Jefferson
Wetlands and Habitats

MAP 6.4



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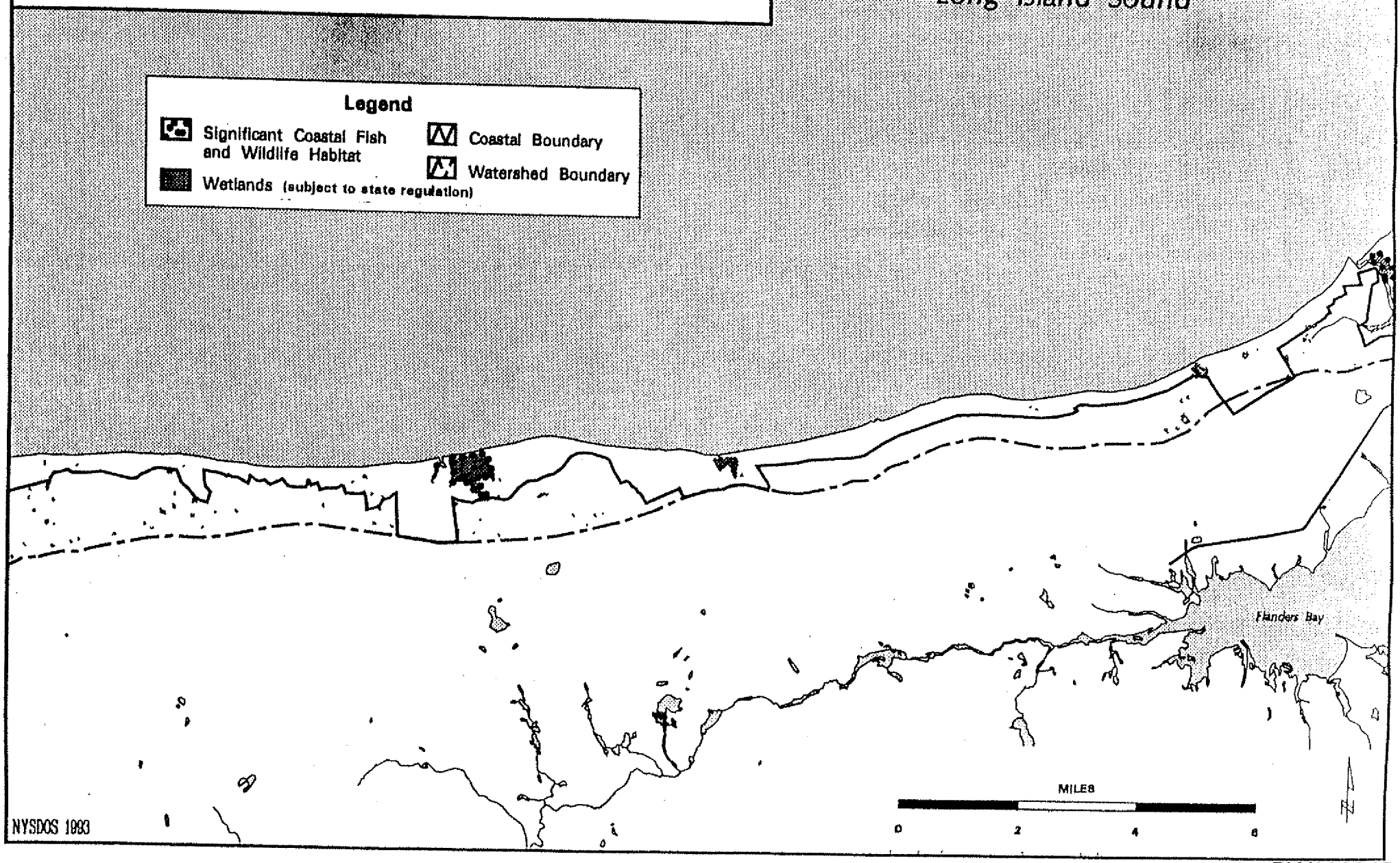
Eastern Suffolk County
Wetlands and Habitats

MAP 6.5



NYSDOS 1983

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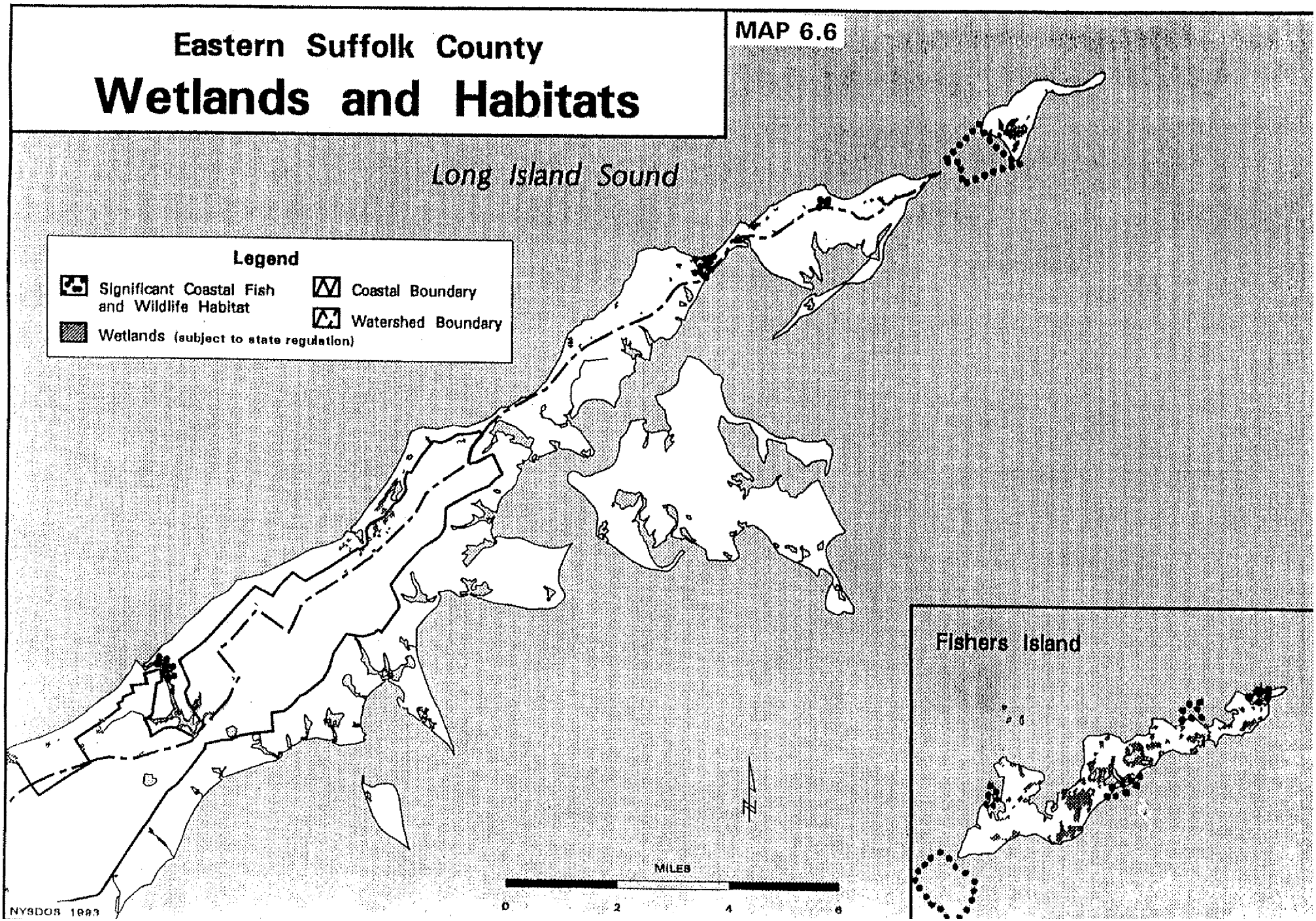
Eastern Suffolk County
Wetlands and Habitats
MAP 6.6
Long Island Sound
Legend
Significant Coastal Fish and Wildlife Habitat
Coastal Boundary
Watershed Boundary
Wetlands (subject to state regulation)
Fishers Island
MILES
0
2
4
6
NYSDOS 1993

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woodchucks, are absent from Fishers Island, white-tailed deer are occasionally seen.

Impairments

The Fishers Island Complex is isolated from the more developed areas of the Long Island Sound region. Impairments of the island's natural resources result primarily from activities on the island itself. Nevertheless, local disruptions considered insignificant in other areas could have severe consequences on the plant and animal life in and around the island, causing local extirpation. Although islands lose species through local extirpations and gain others through colonizations under natural circumstances, human-induced disturbances and introductions of nonindigenous species may accelerate species losses; such accelerated losses might not be counterbalanced by gains on Fishers Island, because of habitat loss and degradation in mainland, or "source," areas.

Development on Fishers Island consists primarily of low density residential uses. The east end is dominated by a golf course. Ferries land in Silver Eel Pond which is the transshipment point for all food, goods, wares, people, vehicles, petroleum products, etc. Silver Eel Pond is located between Hay Harbor and Race Point on the northwest coast of the island. There had been a ferry to West Harbor as late as 1948, but it has since been dismantled. Surface runoff from developed areas is insignificant on the island. On Fishers Island, the Fishers Island Conservancy operates a mosquito control program that uses gambusia and BTI, which may be more environmentally sensitive than other methods. The golf courses on the island implement best available technology and best management practices when applying nutrients, pesticides, and herbicides. It is important to continue these efforts to manage and reduce the use of chemicals and to evaluate other options to ensure that mosquito control and golf course maintenance do not have adverse impacts on the island's natural resources. Upland development has encroached upon some areas of freshwater wetlands and their regulatory adjacent areas. This has led to increased sedimentation in the ponds and has destroyed wildlife habitat.

The shoreline of Fishers Island generally is in a natural state, with little evident bulkheading or seawall construction, except in West Harbor, which has been altered with bulkheaded piers for the ferry landing and the Fishers Island Yacht Club. However, only a few rotten bulkheads remain to mark the location of the former ferry.

In addition to the above activities causing specific, known impairments, there are a variety of other activities that may cause damage to the complex (see the list of potential impairing activities at the beginning of this section).

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Issues and Management Opportunities

A growing environmental awareness in the 1970s led to strengthened federal and state environmental protection legislation. State legislation included: the tidal and freshwater wetlands acts, the State Environmental Quality Review Act (SEQRA), and the Waterfront Revitalization and Coastal Resources Act (WRCRA). These laws and their implementing regulations sought to address procedural and substantive issues relating to development impacts on ecological systems.

These and other environmental regulations focused attention on vulnerable resource areas and established certain development restrictions, but despite the legislative and regulatory advances of the last two decades, the losses continue. As development moves eastward on Long Island, once-intact wetlands and upland ecological communities continue to be altered by new docks, buildings, parking lots, and roads. In less apparent, more gradual ways, ecological communities throughout the region are being degraded by erosion, sedimentation, chemical pollution, removal of buffer areas, fragmentation of open space, and other development-related disruptions.

Many efforts to protect environmental resources have been reactive and narrowly focused. According to existing regulations, only certain actions are subject to review and approval, and government agencies simply respond to permit applications as they are received. In their reviews, agencies attempt to minimize environmental damage by denying or conditioning permits, based on standards that may be unclear or obsolete. To complicate matters, proposed actions often require several permits, and the reviews still tend to be conducted without adequate consultation among the various involved agencies and programs. As a result, individual reviewers are not able to assess the collective impact of the different permit decisions on a particular area. Reviewers are further hampered by a lack of information on the complicated physical, biological, and chemical connections within and between ecological communities. Even when detailed information is available, mandated time frames limit their ability to apply it.

Because of these information and time constraints, reviewers are unable to determine the effect of one development action on larger ecological systems. Nor can they assess the cumulative impacts over time of existing development combined with incremental new development, particularly small, seemingly insignificant projects. It is clear that regulation alone is inadequate to prevent environmental losses and that opportunities must be sought to shift the emphasis from a reactive stance to a more proactive approach.

The LIS CMP, by delineating ecological complexes, directs attention to larger, ecologically cohesive units and spells out specific management steps to protect and restore components of these units. This program, in combination with the state Open Space Conservation Plan and funds available through the Environmental Protection Fund, forms the framework for a new way of advancing environmental management objectives in the Long Island Sound region.

The recommendations contained in volume 1 of the Long Island Sound Coastal Management Program call for a variety of measures which together will constitute a more integrated and active approach to managing ecological resources.

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EROSION AND FLOODING HAZARDS

Erosion and flooding have been causing changes in the coastal geography of the Long Island Sound region since glacial retreat began thousands of years ago. Beaches and dunes have developed and changed; bluffs have slumped and been washed away, inlets have opened and closed, bays have changed shape and depth, and wetlands have appeared and disappeared. These events, whether occurring incrementally or in a single storm event, are part of a dynamic natural process that never allows coastal landforms to remain the same for more than a moment in geologic time.

Natural processes acting upon unencumbered coastal features, such as nearshore areas, beaches, dunes, bluffs, wetlands, and floodplains, are not considered hazardous. The notion of coastal hazards arises only when people build their houses and businesses on these dynamic landforms, then suffer serious damage from coastal processes that produce erosion or flooding. Believing it possible to control the effects of these powerful natural processes, people often call for reinforcement of the shoreline to protect their property. This intervention frequently fails to make dynamic landforms static and often exacerbates hazards in adjacent areas.

While population levels have been relatively stable for Long Island in recent years, development in coastal areas, including hazardous locations, has steadily increased. As growing numbers of people choose to live in coastal hazard areas, either knowingly or unknowingly, it has become ever more difficult to balance the long-term need to protect coastal landforms from human encroachment with the short-term desire to realize economic gains from coastal development.

FACTORS AND TRENDS AFFECTING EROSION AND FLOODING

Erosion and flooding along any shoreline result from the interaction of a number of factors. These include the prevailing geologic conditions of the shoreline, sea level changes, and the various forces—currents, waves, wind, storms, sea levels, and human activities—which together cause sediment to be removed from one location, to drift, and to be deposited at another location along the shoreline. The rate and degree of shoreline erosion, accretion, and flooding can vary significantly over short distances depending on how the above factors interact. The rate and degree of erosion and accretion can also vary from season to season, over longer periods of time, or as a result of specific, non-cyclic events, such as a large storm.

The geologic composition of the shoreline determines the vulnerability of the shoreline to erosion. Hard, metamorphosed sediments are resistant; soft unconsolidated materials, like sand and gravel, are more susceptible. Along the Long Island Sound shoreline, the bluffs are composed of highly erodible materials and are the primary source of sediment supply for beach building. Sediment supply is critical in determining whether a beach or barrier landform will erode, remain stable, or accrete. Even when impacted by erosive forces, a beach or barrier can remain stable if there is sufficient sediment supply.

Currents, waves, and wind are the forces that move eroded materials into the littoral zone and along the coastline. In many areas of the Sound shore, local geology plays a significant role in directing these forces. Headlands and peninsulas tend to act as focal points for high energy waves, whereas broad inshore bays experience less intense wave action per foot of

BW038049

shoreline. Coastal storms, particularly hurricanes and winter storms, or nor'easters, often play the most dramatic role in altering shoreline configuration through rapid erosion of beaches and bluffs by high energy waves and wind combined with high water elevations.

Hurricanes, with wind speeds in excess of 74 miles per hour, are the most powerful storms likely to strike New York. Between 1899 and 1991, New York was hit directly by nine hurricanes, more than any other state north of North Carolina. Review of the literature on historical storms indicates natural cycles of frequent and intense storms alternating with cycles of infrequent, low intensity storms. The past 20-year period (1970–1990) has been relatively quiet with storms being less frequent and intense. Despite this fact, moderate to severe coastal storms have impacted the region at the rate of at least one every two years.

There is evidence to suggest that present conditions for hurricane generation are approaching those that existed during the 1949 to 1969 period, when storms were more numerous and more intense than recently. Moreover, global warming may accelerate increased storm activity and severity, if predictions are correct. With more frequent storms resulting from a natural change in cycles of frequency or from global warming or both, the shoreline will have less time to recover naturally from the damage caused by each storm—and the more intense coastal storms, with larger, stronger, and more frequent waves, will cause more serious erosion and flooding.

The most severe **nor'easters** since 1865 occurred in March 1962 and December 1992. The wave heights and storm surge from nor'easters are generally not as dramatic as those associated with hurricanes; however, the shore-altering effects of nor'easters can be as great, because they linger longer over the coast.

Sea level rise relative to the shore is another significant factor in the incidence of erosion and flooding over time. The rise in relative sea level has several causes, each operating over different temporal intervals and each varying in the magnitude of its impact. These include changes in the direction of movement of the earth's tectonic plates under the sea, faulting of the sea floor, deep ocean sedimentation, rebound of the land and sea floor from ancient glaciers, changes in climate and weather patterns, and other complex, interrelated causes. The resulting sea level rise varies from place to place depending on how these complex causes interact. For the Sound, tidal gauge data collected within the last 100 years suggests a relative sea level rise varying from about 0.1 inches to less than 0.04 inches per year.

While the scientific community agrees the historical rate of sea level rise can be expected to continue in the near future, there is controversy surrounding the potential increase in the rate of rise from global warming. Early estimates of the increased rate of sea level rise due to excess emission of greenhouse gases suggested a sea level rise of two to seven feet in the next century. Recently, this figure was adjusted downward. The Intergovernmental Panel on Climate Change is currently projecting an increase of less than two feet in the next 100 years.

Although many questions remain about the ability of models to accurately predict the factors that cause sea level rise, rising sea levels can be expected to cause increased erosion rates and more extensive flooding along the Sound. At the present rate of approximately 0.04 to 0.1 inches per year, a horizontal movement of mean sea level of one to three inches per year (assuming a 1 on 30 beach/nearshore slope) is anticipated in the region. A rise of mean sea level of two feet would result in a landward migration of coastal waters of sixty feet. There are already thousands of structures identified as susceptible to coastal erosion and flooding

BW038050

in the region. A significant rise in sea level could destroy the natural barrier, bay, and wetland system and inundate low-lying areas along the Sound, further threatening developed areas.

The final factor in determining the rate of shoreline erosion is **human intervention**. Through construction of shoreline engineering works, dredging for navigation, and various soft-structural erosion management approaches, such as beach nourishment, humans have become a major factor in influencing coastal erosion and flooding. Compared to other factors discussed, human intervention has been important only over the last 200 years, but the impacts have been dramatic, causing rapid changes to the shoreline in a short period of time.

Engineered structures can halt, retard, mitigate, or accelerate shoreline erosion. Some may be responsible for preventing upland erosion while causing beach erosion. Others may have multiple effects on the beach. Table 11 shows the extent of hardened shoreline along Long Island Sound compared with the remaining natural shoreline. Examples of the detrimental and positive impacts of engineered structures are abundant along shorelines of the United States and along the marine coast of New York.

Dredging is a common activity along the Long Island Sound shoreline. Development around the Sound has resulted in increased demands for stabilization of inlets and for dredging of channels. Current dredging operations remove sediments from the natural system, causing barrier landforms, especially those on the downdrift side of inlets, to erode. Unfortunately, these operations ordinarily do not put clean dredged material back on the beaches and dunes where it is needed.

Replenishment of the sand supply, called nourishment, temporarily sets back the erosion clock. Sand will continue to be eroded by natural processes, and periodic renourishment is required. This technique of erosion mitigation is usually one of the least environmentally offensive solutions. It may also be cost-effective compared with the construction of hard structures. Nourishment also can preserve public beaches, which are limited in number along the Sound shoreline.

Although the population of the Long Island Sound region has not grown significantly since 1970, residential development continues to be attracted to coastal locations, which are always desirable and highly marketable, but also often potentially dangerous. Many new developments have located very near the shoreline and associated natural protective features. Some have built erosion control structures that may well provide only temporary, illusionary safety or may unintentionally worsen erosion and flooding problems elsewhere. Where, for whatever reason, such new development is not initially protected, it can be expected that property owners confronted with the inexorable natural forces of the coast will increasingly demand that government undertake costly erosion control measures, using public dollars to protect private development. Demands for protection against real or perceived erosion threats will only escalate if more new development is allowed to locate in hazard areas. The result will be a continued haphazard hardening of the region's shoreline with little consideration given to the prevailing erosive forces or the effect erosion structures will have on these forces throughout the region.

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Table 11 Natural and Hardened Shoreline: Westchester, Nassau, and Suffolk Counties

	FEET	MILES	PERCENTAGE OF TOTAL
Westchester County			
Natural Shoreline			
Rock Outcrop	46,250	8.8	20%
Beach	34,950	6.5	15%
Wetland	33,400	6.3	14%
Total	114,600	21.6	49%
Hardened Shoreline			
Rip Rap	21,400	4.1	9%
Sea Wall	96,350	18.3	42%
Total	117,750	22.4	51%
Grand Total	232,350	44.0	100%
Nassau County			
Natural Shoreline			
Beach	218,650	41.4	33%
Wetland	85,150	16.1	13%
Total	303,800	57.5	46%
Hardened Shoreline			
Rip Rap	103,875	19.7	16%
Sea Wall	254,300	48.2	38%
Total	358,175	67.9	54%
Grand Total	661,975	125.4	100%
Suffolk County			
Natural Shoreline			
Rock Outcrop	38,500	7.3	4%
Beach	496,025	94	53%
Wetland	164,650	31.2	18%
Total	699,175	132.5	75%
Hardened Shoreline			
Rip Rap	75,125	14.2	8%
Sea Wall	155,745	29.5	17%
Total	230,870	43.7	25%
Grand Total	930,045	176.2	100%
New York City			
Natural Shoreline			
Total	68,000	12.9	46%
Hardened Shoreline			
Total	80,000	15.2	54%
Grand Total	148,000	28.0	100%

BW038052

Erosion Conditions and Implications

The Long Island Sound shoreline is varied in its geologic composition. To better address the nature of the Sound shoreline and the hazards it presents, the shoreline was divided into five reaches based on an evaluation of geologic character, littoral drift patterns, relative erosion rates, and existing land use. The reaches are: Westchester-Bronx (the rocky shore); Queens-Nassau-Western Suffolk (headlands and bays); Miller Place, Brookhaven to Mattituck Inlet, Southold (central Suffolk bluffs); Mattituck Inlet to Orient Point, Southold (eastern Suffolk bluffs); and Fishers Island (see maps 7.0-7.6).

Reach 1: Rocky Shoreline (Westchester-Bronx)

The rock outcrops along the Westchester-Bronx shoreline protect a series of harbors and bays with wetlands, mudflats, and some beaches. These features are important for erosion and flooding protection of adjacent uplands, because they disperse storm wave energy and absorb stormwater runoff.

Comprehensive erosion rate data are not available for Westchester County and the Bronx, but the geologic composition of the shoreline suggests erosion is minimal along most of the coast because of the natural protective bedrock formations. Pocket beaches and marshes are the exceptions, because fine-grained sediments are potentially more susceptible to rapid erosion. A limited shoreline change analysis of Westchester and the Bronx between 1882 and 1990 has shown measurable (1.5-2 feet/year) erosion at a number of the pocket beaches. These locations include: Playland Park and Parsonage Point in the Town of Rye, the Edgewater Point Jetty in Larchmont Harbor, Echo Bay in New Rochelle, and Orchard Beach-Twin Islands in the Bronx. Other areas in Westchester County that may also be susceptible to erosion include: the cobble recurved spit in Manursing Bay and beach areas at the Westchester Country Beach Club, Edith G. Read Nature Preserve, Rye Town Park, Milton Point, Beach Point Club, Davenport Neck, Glen Island Park, and Davids Island.

Along the Westchester County coast, land use is generally low density residential (less than 2 dwelling units/acre) with some intermixed commercial and medium density (5-10 dwelling units/acre) residential in the protected harbors and bays. In the Bronx, land use is predominantly medium and high density residential with open space/recreational land intermixed.

The coastal erosion hazard area (CEHA) in Westchester County, which designates natural protective features, not necessarily areas which are presently eroding, includes about 300 structures, primarily residences or recreational facilities. These are concentrated in the cities of Rye and New Rochelle. Coastal erosion hazard areas have not been designated in the New York City portion of Long Island Sound. Fifty-seven percent of the shoreline of Westchester County is in a natural form and 43 percent has been hardened with protection structures. Even within protected bays and harbors where there is less erosion potential, about 24 miles of shoreline, more than 58 percent, has been hardened. In addition, there are 51 groins and jetties along the Westchester shoreline, all of which are located in the CEHA.

While erosion is not a major concern along the coast in Westchester County and the Bronx, this section of the Sound coast is subject to riverine and coastal flooding. In Westchester County, flooding occurs along many areas of the immediate shoreline. The areas with the most potential to be adversely affected are in the cities of Rye and New Rochelle and the Village of Mamaroneck. The extent of coastal flooding was illustrated recently during the

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December 11-12, 1992, nor'easter when damage occurred in areas 100 to 200 feet outside the county's mapped 100-year floodplain (A-zone). Currently, there are over 1,080 structures in the low lying areas along the Sound and the rivers of Westchester County, with 150 structures located in high hazard areas or V-zones. In New York City, the U.S. Army Corps of Engineers has identified the east Bronx shoreline and islands as an area where flooding and storm-related erosion can be a problem. It is estimated that there are 1,197 buildings in the flood area. Of these, 955 are in the A-zones and 242 are in the V-zones.

The rocky shoreline areas of Westchester County and the Bronx will not see an increase in erosion rates because of the natural protective nature of the bedrock outcrops and the absence of any significant sources of easily erodible material. However, some of the natural and man-made pocket beaches can expect increased erosion, as sea levels continue to rise. The increase in sea level will also result in gradual inundation of the rocky coast, leading to increased flooding. In addition, the predicted increase in frequency and intensity of coastal storms can be expected to result in an increase in the severity of coastal and riverine flooding.

Although significant population growth is not predicted in the Westchester-Bronx area, development pressures will continue along the coast. Because only 1 percent of coastal land remains vacant, little new development will occur. Instead, there will be pressures to convert existing beach clubs into residential complexes and to expand structures or rebuild properties damaged by increasingly severe storms. Redevelopment in the coastal area will lead to calls for government to build more protective structures, thus putting additional demands on limited government funds. In some cases, the dangers could be such that erosion protection structures would be insufficient and the preferable alternative would be to relocate structures out of hazard zones. On-site retreat might be possible in certain situations, where the lot dimensions and size and type of structure allow; however, larger structures might not have sufficient space for on-site retreat. With such a limited supply of vacant coastal land, relocation of damaged or threatened structures to other lots within the coastal area also might be difficult.

Reach 2: Headlands and Bays (Queens-Nassau-Western Suffolk Headlands and Bays: From Willets Point, Queens to Miller Place, Brookhaven)

The western end of the reach is sheltered, while the more eastward portions are increasingly subject to the erosive effects of wind and waves. Generally, the areas most susceptible to erosion throughout the reach are the exposed ends of the headlands and the exposed bluffs along the eastern portion of the reach. The prominent seaward position of the headlands makes them focal points for coastal forces. Although comprehensive erosion measurements have yet to be completed for the reach, measurable headland erosion is known to be occurring: at Kings Point and Sands Point in North Hempstead; at Weeks Point in Oyster Bay; along the steep bluffs and beach at Caumsett State Park in Huntington; and from Crane Neck Point to the Maryville Convent and from Old Field Point eastward along Old Field Preserve in Brookhaven. An analysis of shoreline change from 1885–1968 suggested rapid headland erosion is also occurring in Bayville and Centre Island (Davies et al, 1973). Erosion along the Asharoken tombolo has been a major problem over the past 25 years. In addition, the stretch of bluffs in Smithtown from Fresh Pond through Sunken Meadow State Park is eroding rapidly.

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Sand and gravel eroded from the headlands is deposited in narrow beaches at the base of headlands or bluffs or is transported alongshore and back into the adjacent bays, forming baymouth spits and bars. Certain features of this type in Nassau County appear to be eroding including: the spit at Plum Point in Manhasset Bay, the smaller barrier spit and marshland between Barkers Point and Sands Point, the beach along Cedar Knoll Drive, and the wide barrier beach near East Creek marsh.

Outside of Queens, where coastal land use is characterized by dense one and two family development, the land use is predominantly low to medium density residential, intermixed with open space and recreational uses. In Nassau County, pockets of high density residential use, as well as commercial, industrial, and transportation uses, exist adjacent to the bays.

The one coastal erosion hazard area in this reach includes over 450 structures. The majority of the affected structures (71 percent) are concentrated in the Village of Bayville, with the second largest concentration (13 percent) in the City of Glen Cove. Nearly 920 people live within the CEHA boundary. Shoreline protection structures are numerous, even within the sheltered bays. There are 556 groins and 12 jetties. Over 42 percent of the immediate Sound shoreline is hardened by erosion control structures. Within the sheltered bays and harbors, which comprise about 90 miles of the shoreline, 40 percent has been hardened. With regard to flooding in the Nassau and Suffolk county portions of the reach, there are 5,924 structures in the floodplain. Over 13 percent, 795 structures, are located in V-zones (high hazard areas).

The current rates of erosion and levels of flooding in this reach can be expected to continue into the near future. As mentioned previously, hazard conditions may worsen as sea levels rise and the frequency and intensity of coastal storms increase. When this occurs, hazard areas will move inland as barrier landforms that currently protect the bays are impacted. Wetlands and barrier beaches can maintain themselves and their protective capacities if there is sufficient space to allow for inland migration and, in the case of beaches, sufficient sediment supply to replenish eroded sand. New development, however, continues to encroach upon wetlands, barrier beaches, and their upland buffer areas. As a result, currently sheltered areas, many of them developed, could be exposed to serious erosion and flooding, because the natural shoreline cannot adapt to natural processes, when it comes into contact with static human development.

Significant population growth is not predicted in this reach, but the increasing numbers of households will continue the pressure to develop along the immediate coastline and, unfortunately, in hazard areas. While only 2 percent of coastal area land is vacant, limiting the possibilities for new development, conversion of institutional facilities and private golf clubs into residential complexes could result in a significant amount of high density redevelopment.

The effects of coastal storm damage and sea level rise will require difficult decisions about post-storm redevelopment. For example, in low density areas on the headlands, on-site retreat may be possible due to larger lot sizes. In higher density areas with small lots, on-site retreat may not be possible and relocation away from the coastal area may be necessary given the limited supply of coastal land. In areas where on-site retreat is not possible and relocation is expensive or not desirable, there will be increasing demand for government to fund shoreline stabilization structures.

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Reach 3: Central Suffolk Bluffs (From Miller Place, Brookhaven to Mattituck Inlet, Southold)

East of Port Jefferson, wave action and rainwater runoff erode the loosely consolidated glacial material of the bluffs to form fronting beaches of varying width, slope, and texture. The predominant drift pattern in this reach is from west to east along the mainland beaches. An analysis of shoreline change from National Ocean Survey Maps from 1885-1965 suggests rapid erosion is occurring at Rocky Point and Shoreham Beach in Brookhaven; and from Camp Grant to Jacobs Point in Riverhead. Measurable erosion is also occurring at Miller Place Beach, Hallock Landing, and North Shore Beach in Brookhaven and at Wading River Landing, Camp DeWolf, Fresh Pond Landing, and Wildwood State Park in Riverhead.

The bluffs are broken at Wading River, Baiting Hollow, Luce Landing/Jacobs Hill, and Mattituck Creek. At these locations, barrier beaches protect small tidal mudflats and wetlands. These low-lying areas are important in protecting adjacent uplands from erosion and flooding, because they disperse storm wave energy and absorb stormwater runoff. These are the only locations where coastal flooding is a significant threat.

Medium to low density residential land use predominates, with small pockets of high to medium density residential use interspersed with recreational/open space uses eastward from Miller Place to Wildwood State Park. East of Wildwood State Park, the reach is less developed, and more open space/recreational and vacant land exists.

There are over 380 structures within CEHA boundaries, that is, within 25 feet of the bluff face. Over eight miles, or 26 percent, of the shoreline have been hardened. There are 50 groins and five jetties. In this reach the jetties pose particular problems by interrupting the normal pattern of sediment transport at the base of the bluffs.

Severe erosion will continue the landward migration of bluffs in this reach. Over time, higher sea levels and more severe storms will cause increased erosion of the bluffs through the undercutting action of waves and the infiltration of rainwater. Coastal flooding will increase, although only in localized, low-lying areas.

The presence of significant vacant land along the central Suffolk shoreline means continued pressure for new development. This development is likely to further damage the structural integrity of coastal bluffs. The presence of larger numbers of people traversing the bluffs will also damage their natural vegetative cover, further impairing their stability.

The abundance of vacant land also provides opportunities for relocation of damaged or threatened structures away from hazard areas, but property owners are more likely to place demands on government either to approve or to construct erosion protection structures to further reinforce the shoreline. Absent a change in public policy, uncoordinated placement of shoreline protection structures is likely to continue.

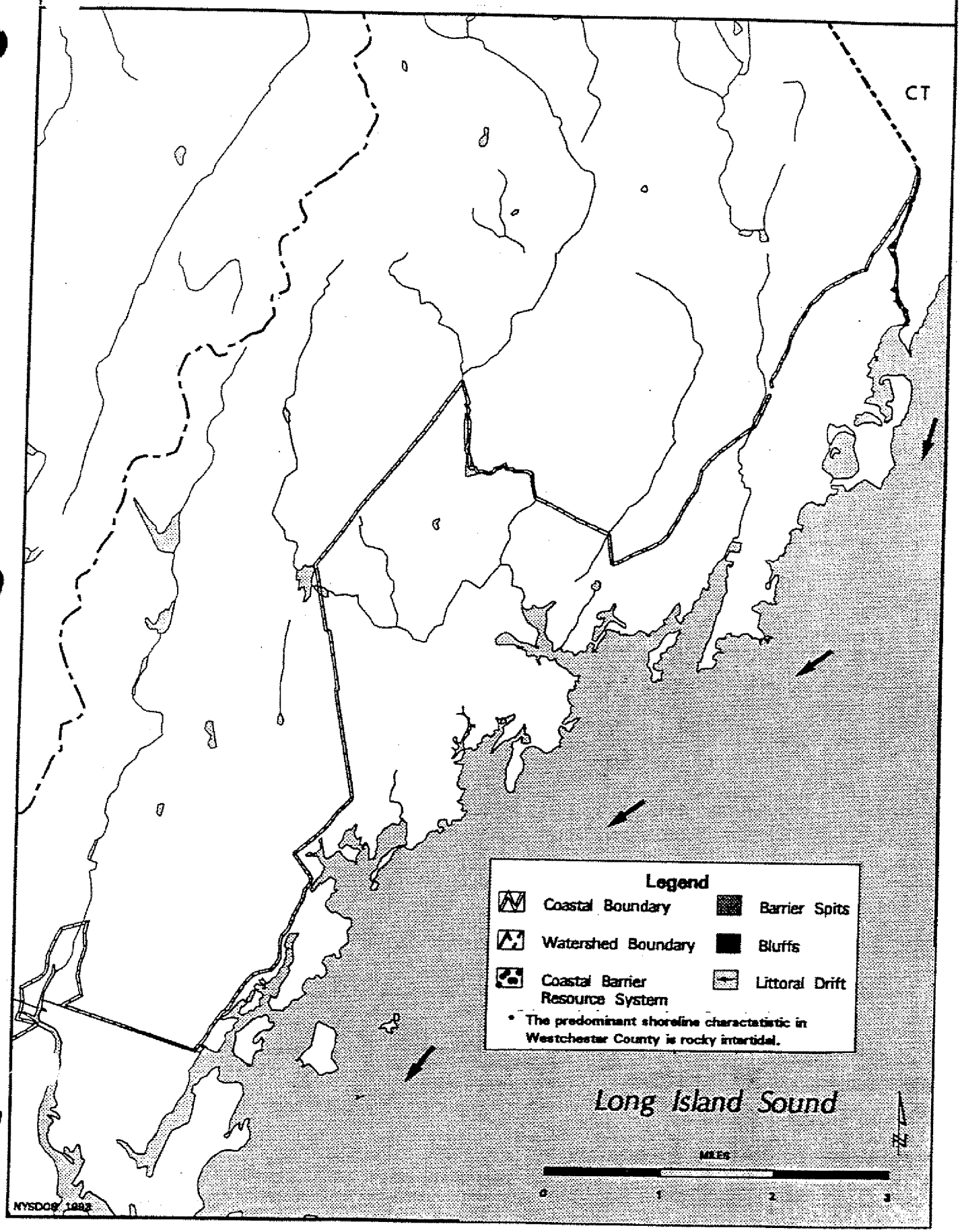
Reach 4: Eastern Suffolk Bluffs (From Mattituck Inlet, Southold to Orient Point, Southold)

This reach consists of intermixed low bluffs (50 foot maximum) and mainland beaches broken by three barrier landforms at Goldsmith Inlet, Hashamomuck Pond, and Dam Pond. Erosion conditions are similar to those in the Central Suffolk Reach. An analysis of shoreline change from National Ocean Survey Maps from 1885–1965 suggests rapid erosion occurring at Baillie Beach east of Mattituck Inlet, at Goldsmith Inlet, at the Peconic Dunes County Park, at Mulford Point, and at Orient Point, all in Southold. Measurable erosion is

BW038056

Westchester County
Shoreline Characteristics

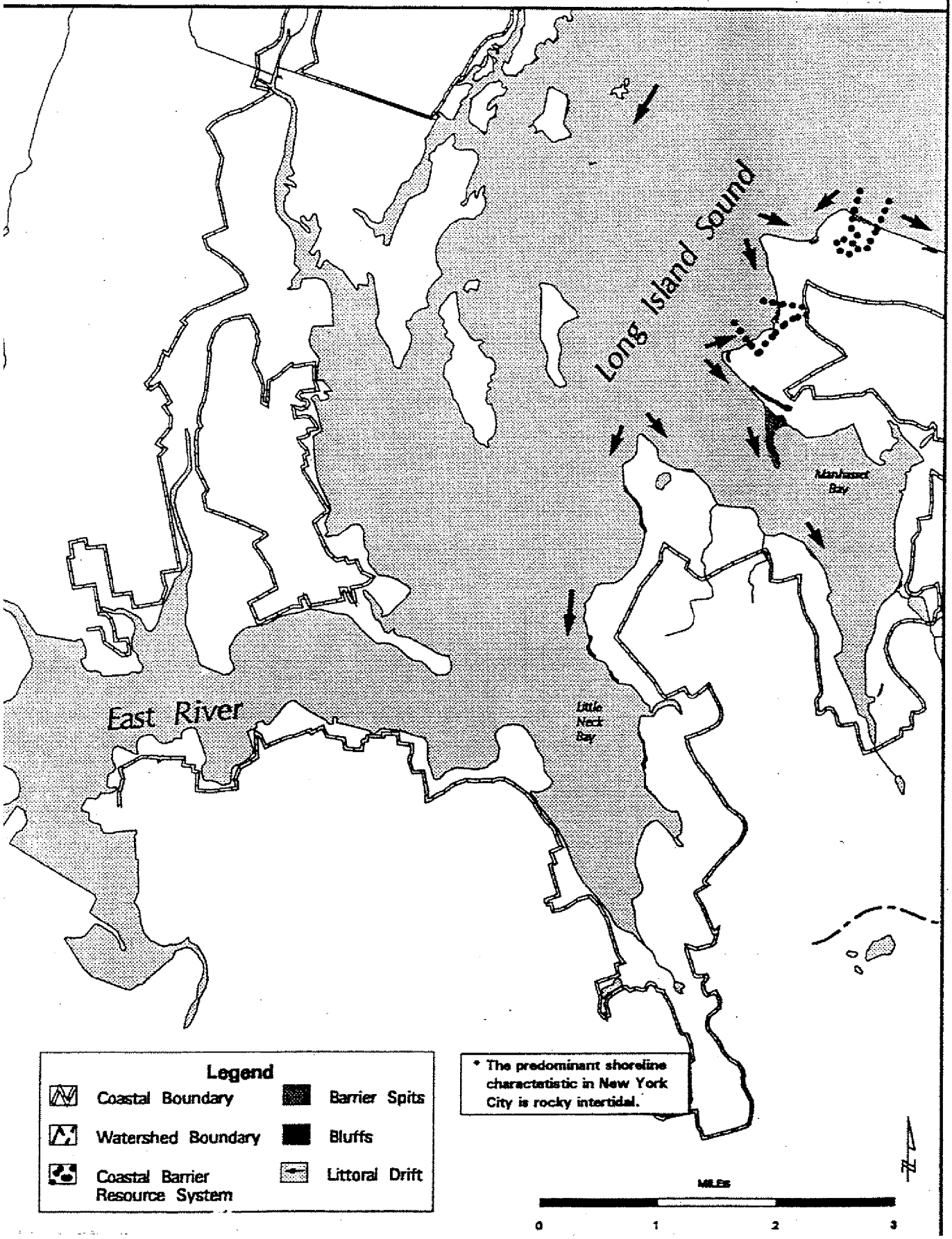
MAP 7.0



BW038057

MAP 7.1

New York City
Shoreline Characteristics



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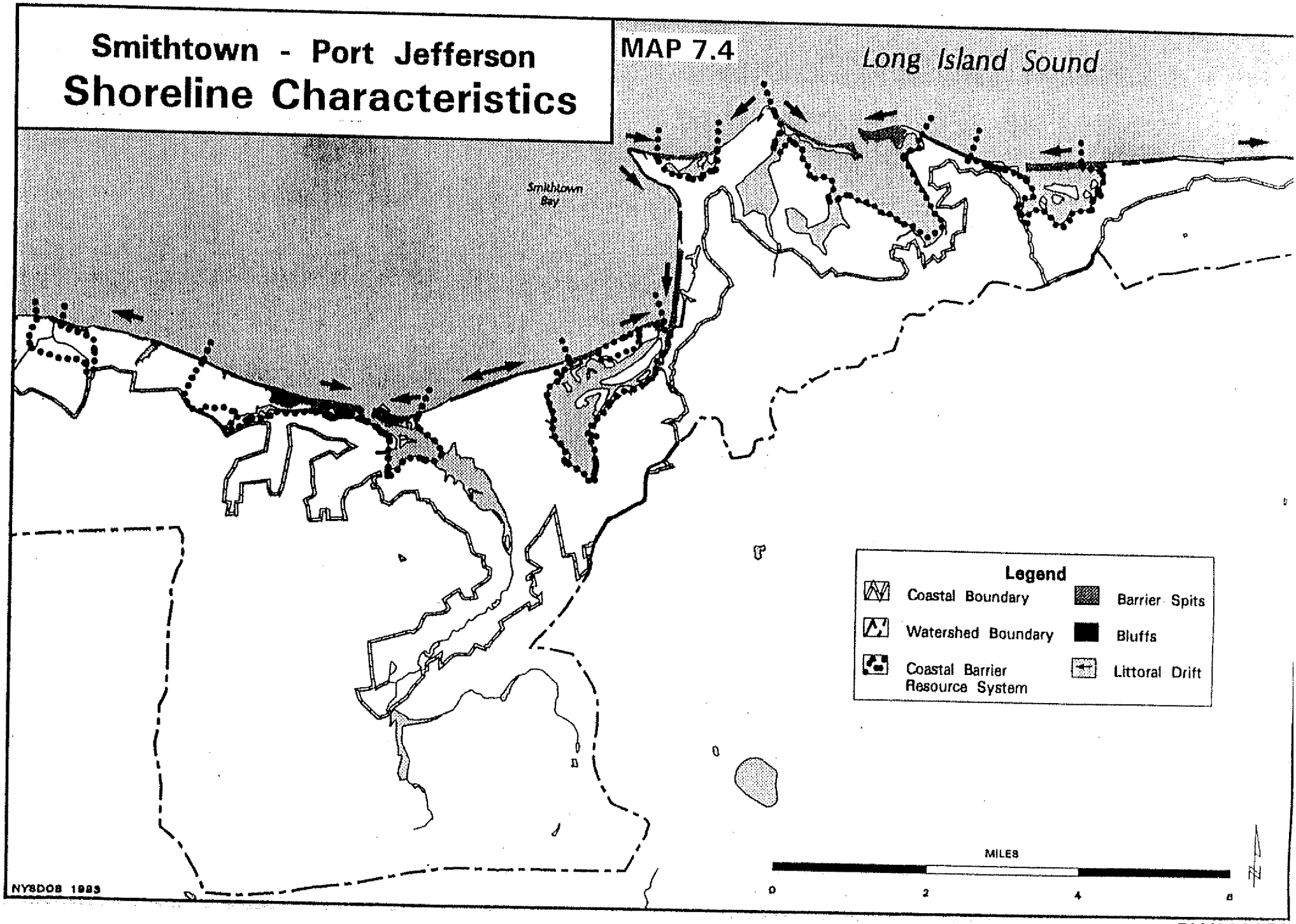
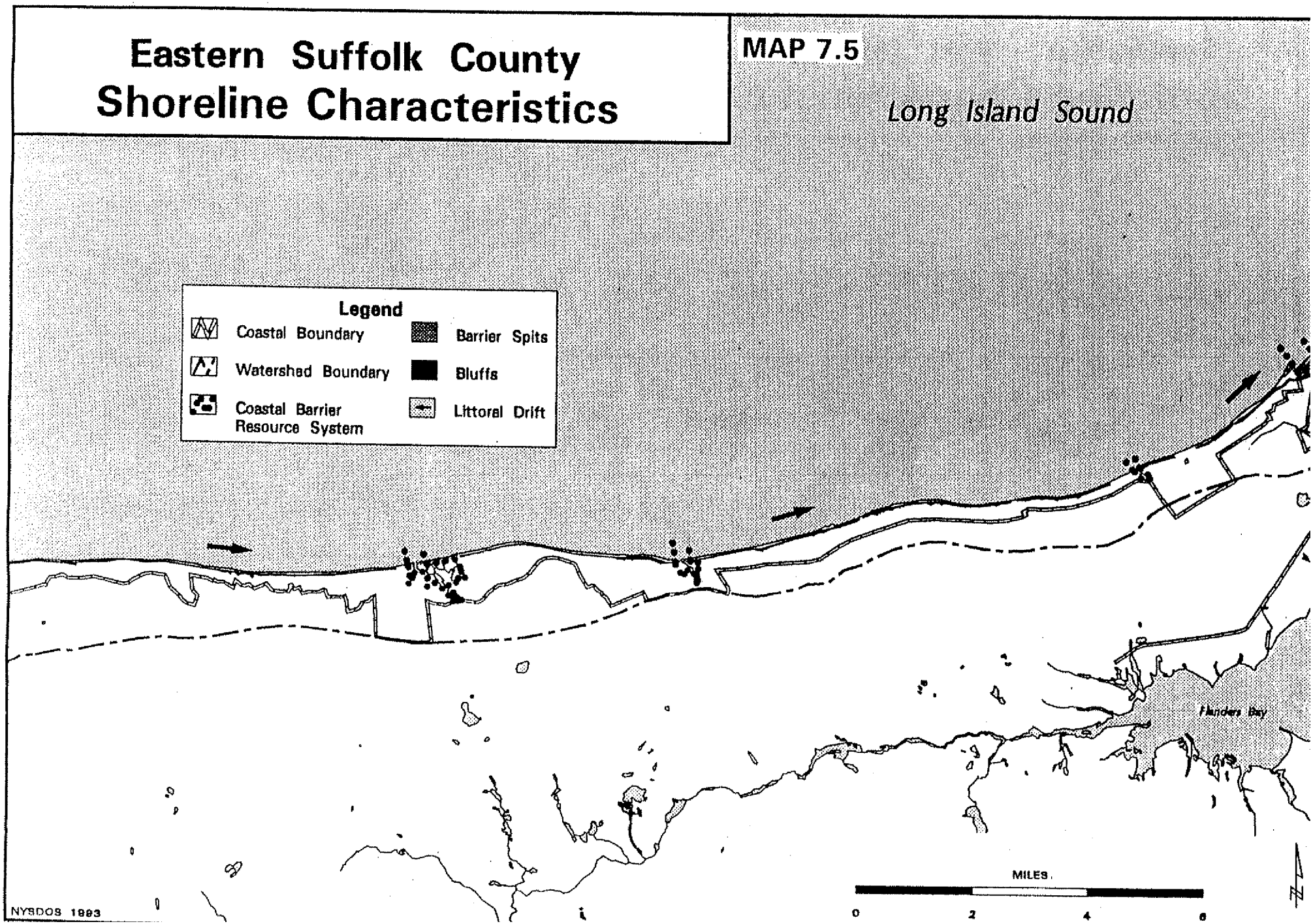

Smithtown - Port Jefferson
Shoreline Characteristics
MAP 7.4
Long Island Sound
Smithtown Bay
Legend
Coastal Boundary
Watershed Boundary
Coastal Barrier Resource System
Barrier Spits
Bluffs
Littoral Drift
MILES
0
2
4
6
NYSDOS 1983

BW038059

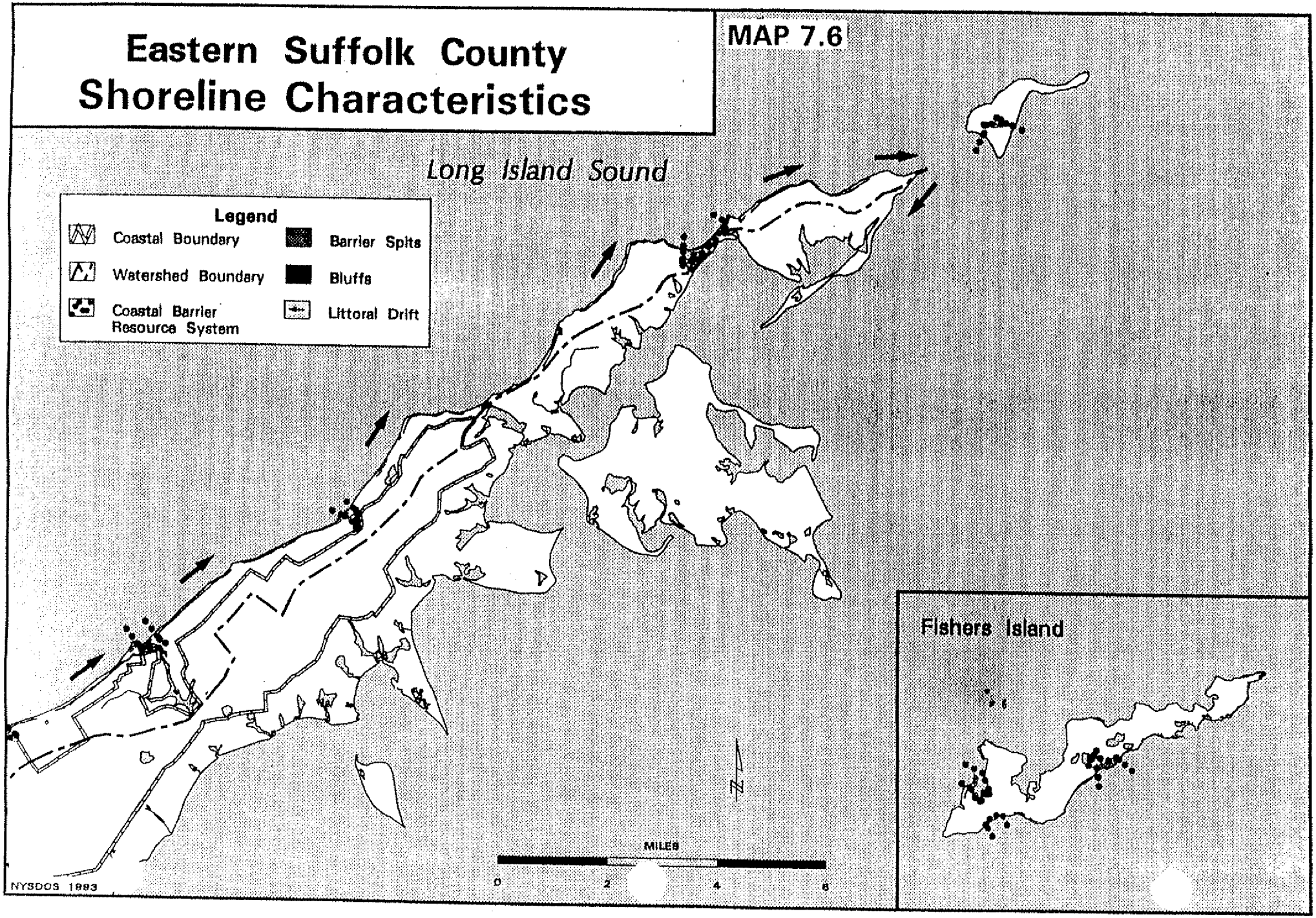
Eastern Suffolk County Shoreline Characteristics



BW038060

Eastern Suffolk County Shoreline Characteristics

MAP 7.6



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occurring at Kennys Road-Horton Lane Beaches in Southold.

The reach is characterized by low density residential land use, intermixed with open space/recreational uses, agricultural uses, and vacant land. The sparse development is illustrated by the small number of structures within the CEHA boundaries—six. Eighty percent of the reach is in its natural state. There are 61 groins and three jetties located along the shore. The jetties are causing dramatic erosion downdrift. Due to the topography and low density of development in this reach, there are relatively few structures in flood hazard areas. Of the 31 structures in the floodplain, 18 are located in V-zones.

Severe bluff and beach erosion will continue in this reach, as in reach 3. Coastal flooding, however, will increase to a greater extent than in reach 3 because of the presence of more low-lying areas. Development pressures and impacts are the same as in reach 3. Because of the abundance of vacant land, opportunities exist for relocation of structures away from hazard areas, but here again, there will be demands for the shoreline to be further reinforced.

Reach 5: Fishers Island

Fishers Island is characterized by low bluffs on the eastern side. These bluffs rise to 50 feet and are fronted by narrow beaches and barrier beach features. The western side of the island is lower in elevation and slopes gradually into the Sound, where there are a number of small rocky coves. The southern side of the island is characterized by medium to high bluffs which rise to 90 feet in places and are fronted by narrow beaches.

There have been no studies undertaken of erosion rates or the littoral drift patterns around Fishers Island.

A large portion of Fishers Island is vacant land. The developed land is primarily large lot, low density residential. A significant amount of open space/recreational land exists on the island. The only population center is in the sheltered, west harbor area, where all of the island's few commercial, industrial, and transportation uses are also located.

Fishers Island has about 24 miles of shoreline, 89 percent of which is in natural condition. Four groins are located on the Fishers Island shore. There are 56 structures within the CEHA boundary on the island.

As sea level and storm conditions change, increased wave erosion of bluffs is likely to occur in the reach, as well as gradual flooding of low-lying barrier landforms and wetlands. As a result, developed areas are likely to experience increased levels of flooding and more severe impacts from storm waves.

Limited growth is predicted in the reach because of access difficulties and the high cost of land. Nevertheless, with continued erosion and storm impacts, the demand for shoreline protection for existing structures may increase. Large lot sizes and a supply of vacant land may allow for on-site retreat or off-site relocation.

BW038062

Major Issues to be Addressed

Maps 8.0-8.6 summarize erosion and flooding hazards along the Sound shore. Throughout the region, valuable public and private development is at risk of being damaged by erosion and flooding.

Widespread attempts have been made to protect property—even property not apparently at risk. These attempts have been costly and, at best, only partially successful in preventing damage. They also have encouraged more extensive development than is advisable in adjacent, upland areas, given the possibility of future hazardous conditions. More serious, these attempts to solve one problem have caused other, possibly worse, problems. For instance, control structures that have prevented erosion and reduced property damage in one location have exacerbated erosion nearby, causing natural protective features to be undermined or destroyed altogether. Control structures have also resulted in the loss of habitats, the degradation of water quality, the destruction of beaches and other public recreational resources, and the impairment of the natural aesthetic quality of the shoreline.

Many members of the general public are simply unaware of the dangers of building in hazardous areas. Once allowed to build, these property owners belatedly become aware of the problems, then seek to fortify their property, when the better approach would have been to build out of harm's way in the first place. Even when individuals are aware of the problem, they lack detailed information on the exact nature of erosion and flooding at specific locations and, as a result, adopt costly solutions ill-suited to particular problems. For instance, in certain areas the potential for serious erosion and flooding is not great, but lack of information gives rise to fear of damage. This fear causes property owners to install heavy erosion control structures, when lighter structures, or even "soft" measures, such as the planting of vegetation, would have sufficed.

Government also needs better data for decision-making. For example, information is lacking on the potential effects of new inlets formed during severe coastal storms. Without this information, government decision-makers have no basis for determining whether or not to close such inlets. There is also insufficient information on littoral transport of sand, making it difficult to determine the best way to deal with the negative effects of jetties on downdrift beaches. Such a situation exists at Mattituck Inlet, where jetties are depriving downdrift beaches of replenishing sand.

The lack of information is only one of a complex set of factors influencing how government responds to the problems of erosion and flooding. Historically, the response has been more reactive than prospective. At the federal level, two programs were instituted to deal with erosion and flooding problems, the Coastal Barrier Resources Act and the National Flood Insurance Program (NFIP). The Coastal Barrier Resources Act prohibits expenditure of federal funds in designated barrier areas. The designated areas are limited in extent, and New York State does not mirror the federal program in funding restrictions.

The NFIP was designed to promote floodplain management by localities by offering flood insurance as an incentive. Unfortunately, it has not been successful in significantly reducing new floodplain development. In fact, some would argue that the availability of flood insurance encourages new floodplain development. Program regulations require new structures to be elevated above the 100-year flood level but there are no provisions for protecting existing development. In another twist of this complex program, the federal government has the authority to mitigate flooding and erosion damage by paying insured property owners for relocation or demolition of structures or by acquiring property outright.

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However, the amount of money appropriated for this has been minimal compared to the number for eligible structures and properties. The federal government has never successfully used this program in New York State, although applications for more than 30 properties in the towns of Islip and Brookhaven, damaged or destroyed in the 1992/93 winter storms, are presently being considered.

Another deficiency in the NFIP is that many property owners in areas not normally subject to flooding, such as bluffs, are unaware that they can obtain flood insurance. Overall, only a small percentage of people eligible for flood insurance actually buy it. Fewer participants means less money in the pool, and recently the pool has been overdrawn, requiring general taxpayer support. Lack of participation also means that homeowners, who could take advantage of the mitigative aspects of flood insurance, remain ineligible and deprived of support for relocation from hazard areas.

At the state level, several programs have been instituted to deal with aspects of the erosion and flooding problem. Chief among these is the Coastal Erosion Hazard Areas Act (CEHA). A primary purpose of this act is to prevent damage to natural protective features, such as beaches and bluffs. The first step in doing this was to designate features and associated areas where development should be restricted because of rapid erosion, called structural hazard areas. In the Long Island Sound region, natural protective features have been designated, except for those found in bay areas. Structural hazard areas, however, have not been designated, preventing state and local governments from implementing the act's provisions within these potentially hazardous areas.

Another aspect of the CEHA that may potentially prove to be problematical is the issuance of variances from provisions of the law that discourage development in erosion hazard areas. Courts have long established that property owners are entitled to an economic use of their property. Thus, if government determines an area to be inappropriate for development and, as a result, property owners are unable to obtain <u>any</u> reasonable economic return from their property, then they must be compensated for the loss. When this situation occurs in an erosion hazard area, the Department of Environmental Conservation may have no recourse but to issue a permit for development, given the limited public funds available for compensation.

Finally, implementation of the CEHA is guided by official maps that show natural protective features and structural hazard areas. Because of insufficient funding, these maps have not been updated, nor the evaluation necessary to designate structural hazard areas completed. This results in a two-fold problem: First, permits for reconstruction may be issued without consideration of changes in hazardous conditions that may have developed incrementally and/or as a result of a storm. Second, permits may be issued for new construction in areas that would be designated structural hazard areas, with the potential for greater threat to life and property.

Another state program, the Coastal Management Program, has several policies dealing with erosion and flooding. These policies together favor a non-structural approach to preventing damage. An evolving strategy includes relocation of structures away from hazard areas. Unfortunately, state agencies have not aggressively enforced these policies as part of the coastal consistency process.

The Uniform Fire Protection and Building Code (UFPBC) establishes standards for construction throughout the state. Changes to the code are being considered. Currently, the

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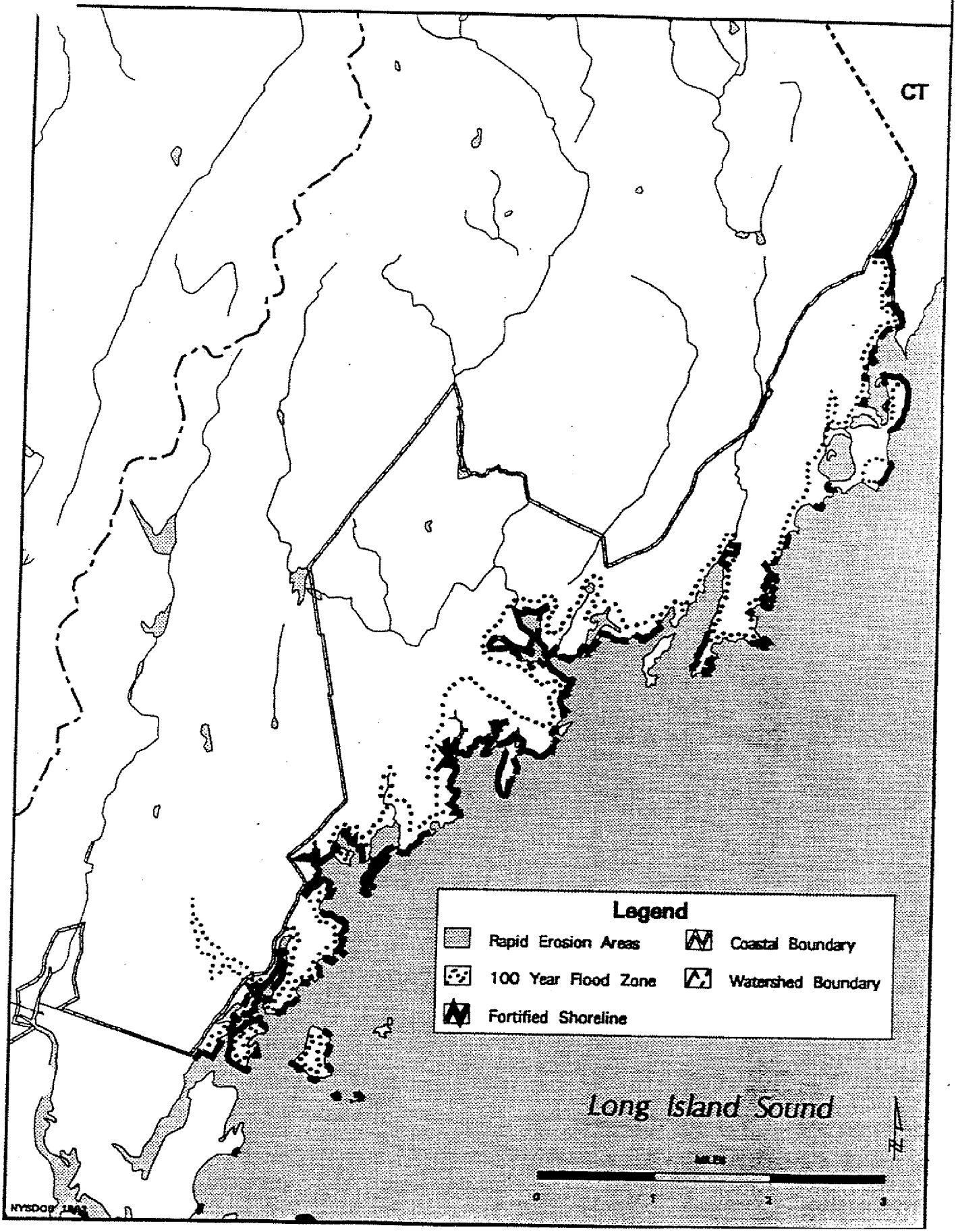
Westchester County
Erosion and Flooding Hazards

MAP 8.0



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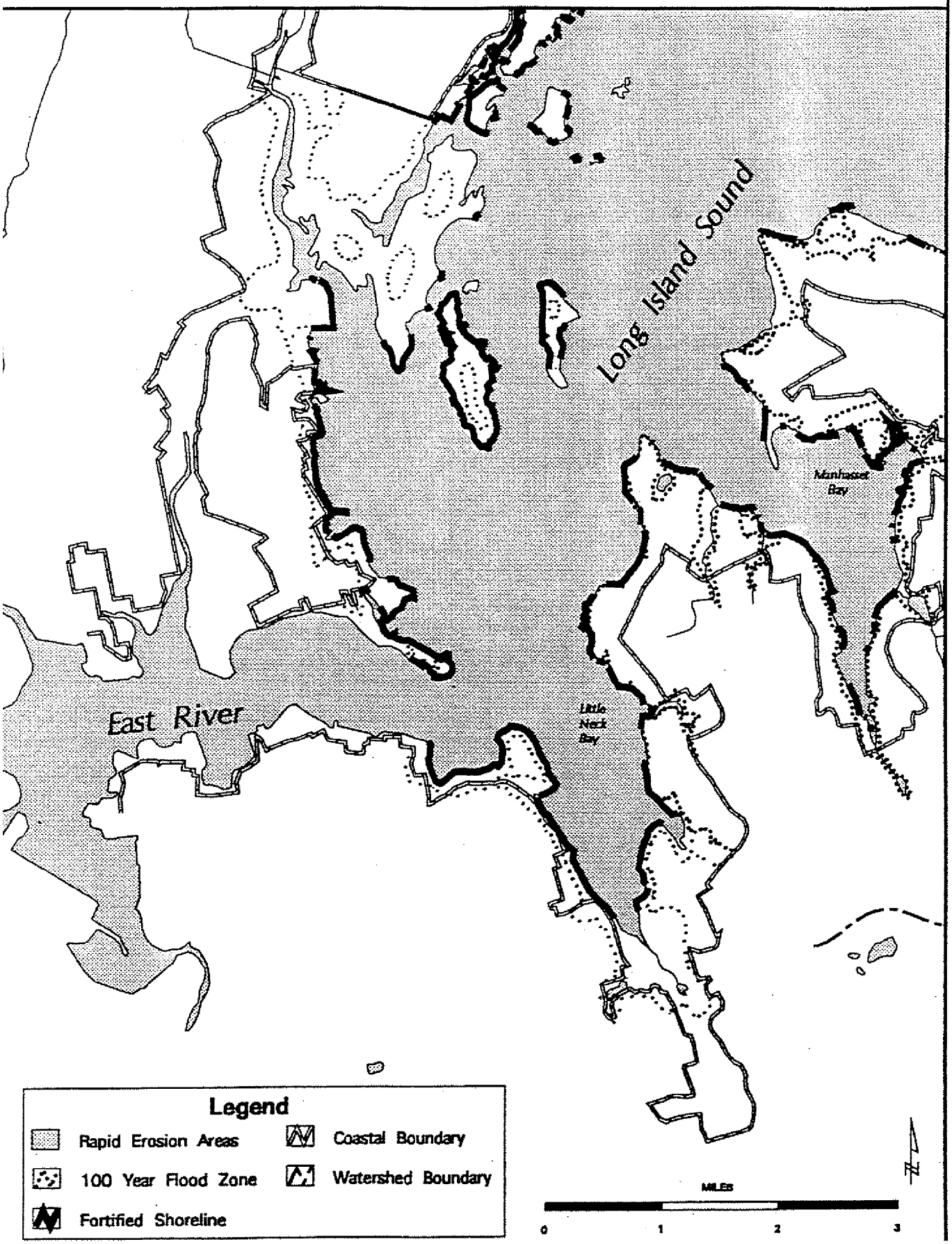
New York City
Erosion and Flooding Hazards

MAP 8.1



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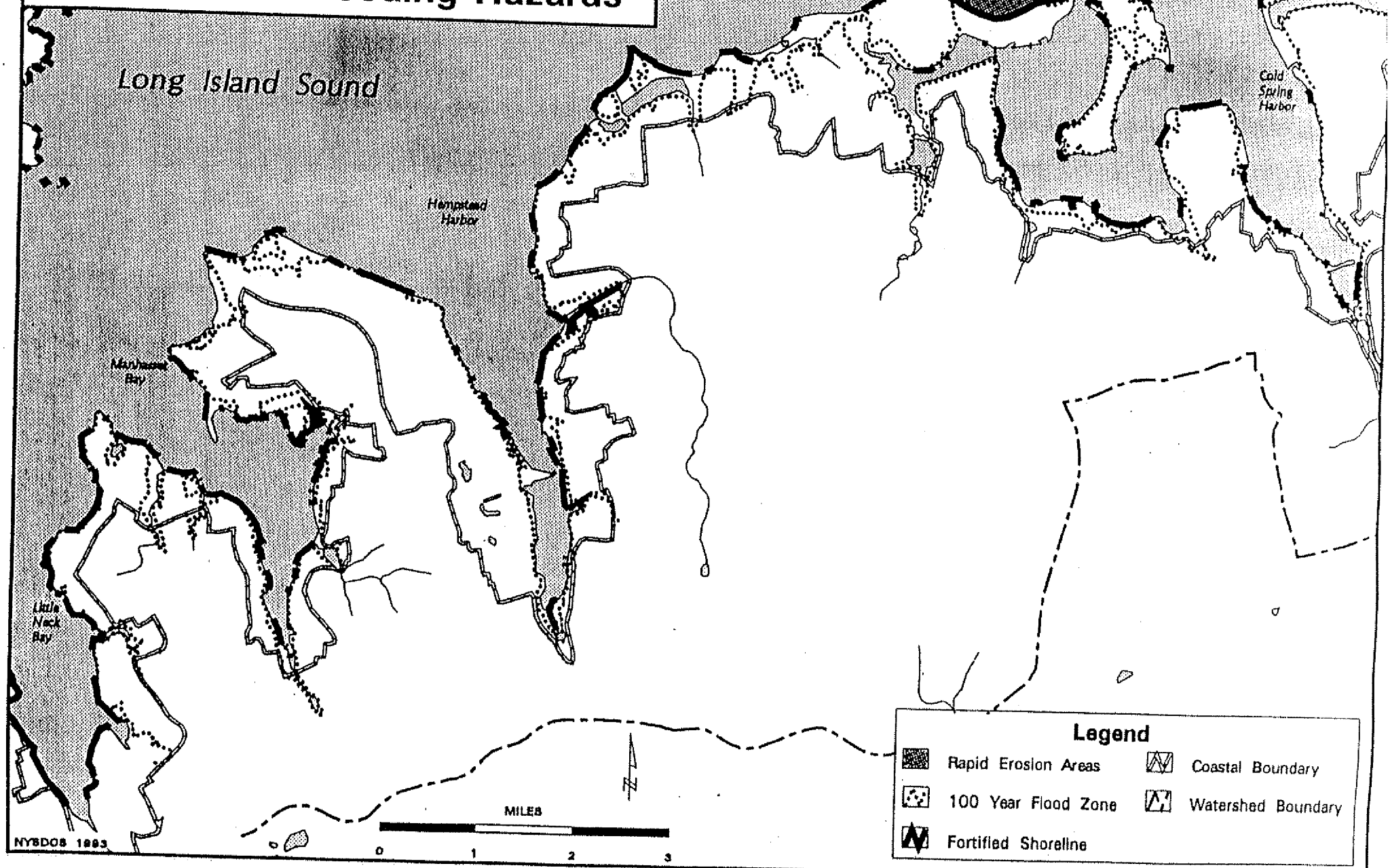
Nassau County
Erosion and Flooding Hazards

MAP 8.2



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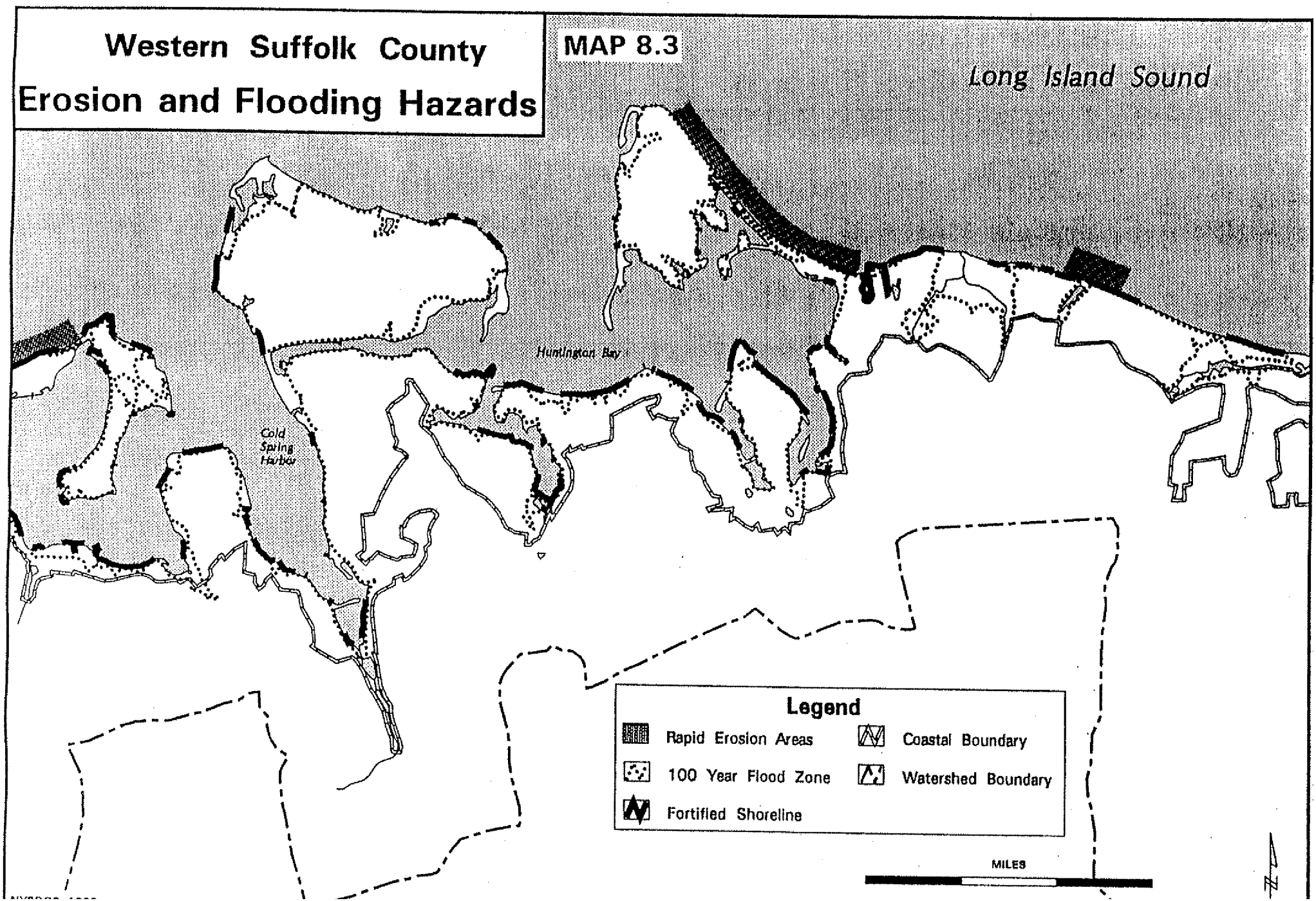
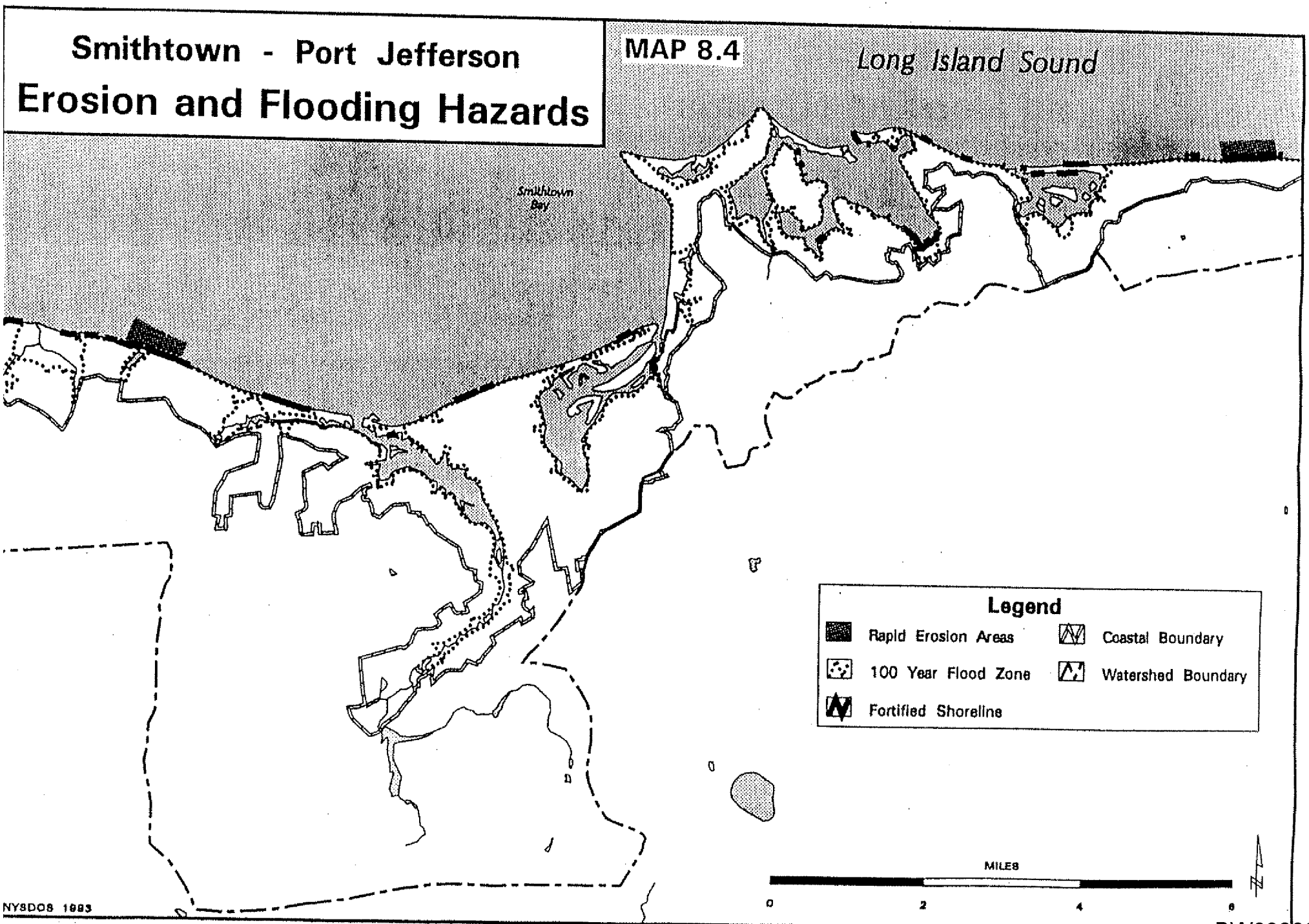

Western Suffolk County
Erosion and Flooding Hazards
MAP 8.3
Long Island Sound
Huntington Bay
Cold Spring Harbor
Legend
Rapid Erosion Areas
100 Year Flood Zone
Fortified Shoreline
Coastal Boundary
Watershed Boundary
MILES

BW038068

Smithtown - Port Jefferson
Erosion and Flooding Hazards



NYSDOS 1993

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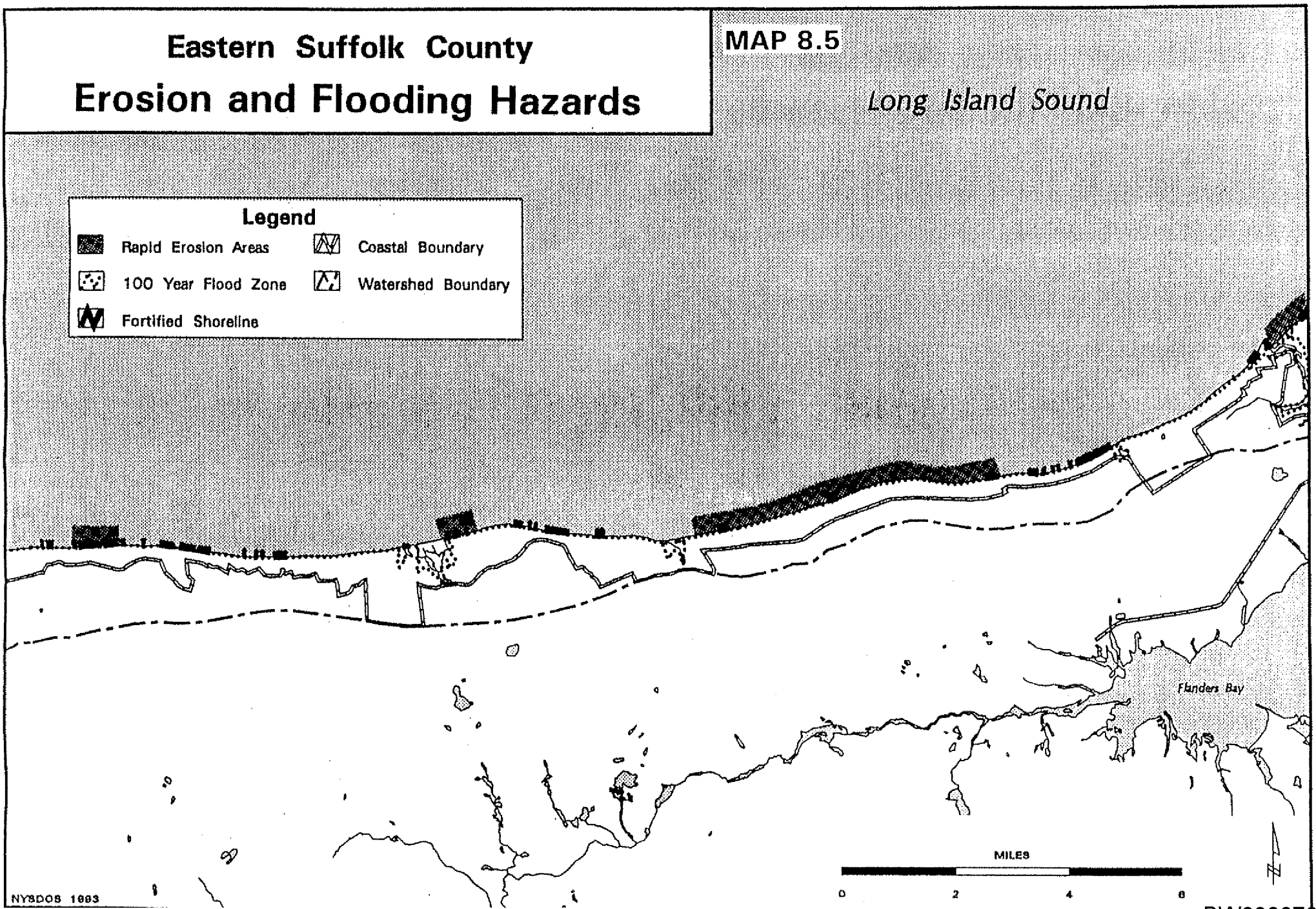
Eastern Suffolk County
Erosion and Flooding Hazards



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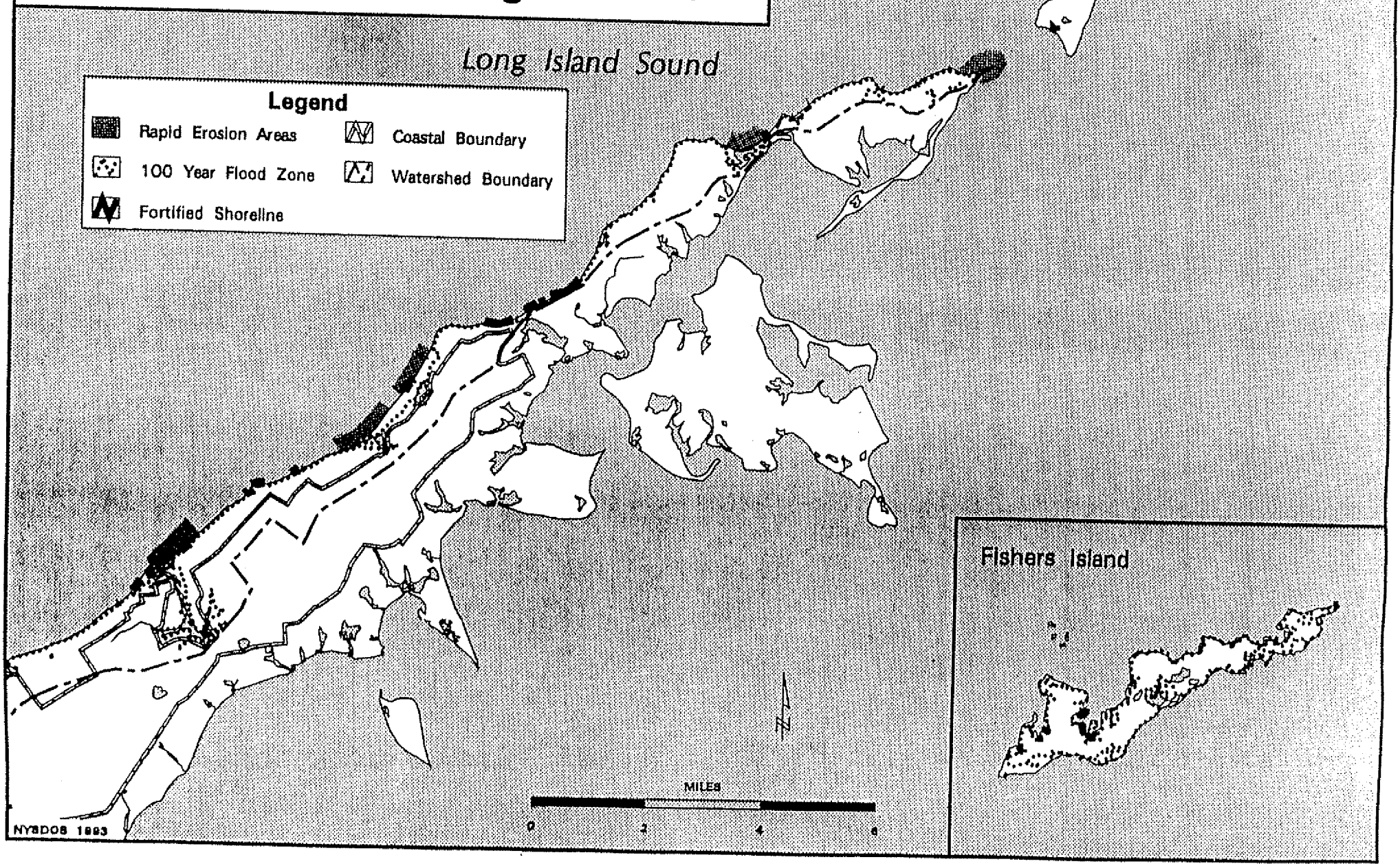
Eastern Suffolk County
Erosion and Flooding Hazards

MAP 8.6



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UFPBC only references federal standards for construction in flood areas. Experience has shown that higher standards, including those to limit wind damage, are needed in the coastal area.

Overall, within and between the various levels of government, there are policy and programmatic conflicts that result in less than optimal solutions to erosion and flooding problems. For instance, the state Tidal Wetlands Act sometimes works at cross purposes with the state CEHA and the state coastal policies. The latter favor soft alternatives to prevent erosion, such as beach nourishment, but depending on the location of an eroding feature, the Tidal Wetlands Act may prevent the application of such an alternative. In another example, the Army Corps of Engineers enforces a federal policy that calls for disposal of dredge spoils in the least costly manner, generally offshore. The state, on the other hand, favors disposal of clean dredge spoils on eroding beaches. At present, the only way to accomplish this objective is for the state to pay the difference in cost between disposal offshore and onshore. Probably the most complex situations involve post-storm clean-up and reconstruction activities, when uncoordinated and conflicting responses on the part of involved government agencies leave individual property owners at a loss as to the acceptable course of action.

BW038072

WATER RESOURCES

The Long Island Sound Study Comprehensive Conservation and Management Plan (LISS CCMP) developed by the Long Island Study (1994) is the most comprehensive summary of water resources issues in Long Island Sound available to date. The CCMP provided an important basis for the water resources recommendations put forth in volume 1 of the Long Island Sound Coastal Management Program, and the LIS CMP complements and extends proposals of the CCMP.

WATER QUALITY AND WATER SUPPLY

Water quality in Long Island Sound and its bays and harbors reflects the variety and intensity of upland development and surface water uses, such as boating and discharge of treated and untreated municipal wastes. In general, water quality improves from west to east as the density of development decreases; however, nearly all enclosed harbors and bays are characterized by varying degrees of water quality impairments. Appendix 3 contains the listings for the Long Island Sound watershed from the Priority Water Problem List prepared in 1991 by the New York State Department of Environmental Conservation (NYS DEC). This list summarizes impairments for specific water bodies and the resulting impact on the use of the water body.

The sub-watersheds of the western portions of the Sound, including Westchester County, the Bronx and Queens, and western Nassau County, are characterized by concentrated urban development and intensive suburban uses. As a result, there is significant pollution of coastal waters from both point and nonpoint sources. Nutrients, pathogens, toxic substances, such as petroleum products, and sediments all find their way into the Sound.

Westchester County has an extensive watershed stretching northward into Connecticut. Development within the watershed has increased sediment loadings to tributaries leading to the Sound, and fertilizers and pesticides used in excessive amounts for residential, corporate, and golf course landscaping also migrate to the Sound.

Population growth in Westchester County over the past twenty years has outpaced sewage treatment capacity. Municipal wastewater treatment facilities are inadequate in some areas, particularly during periods of high flows from storm sewers. Illegal connections of sanitary sewers to storm sewers increase the problem. Urban runoff, including runoff from roads, parking areas and other impervious surfaces, and oil spills and seeps, also contributes to water quality impairments.

Combined sewer overflows (CSOs) are a significant pollution source in New York City's Sound coast and contribute to water quality problems to the east. Pathogens are the major pollutants of public health concern from CSOs; however, CSOs also carry urban runoff, such street litter, oils, and animal wastes directly to coastal waters. This urban runoff from CSOs accounts for a large portion of the water quality problem in New York City's coastal area.

Malfunctioning on-site sewage disposal systems, fertilizers and pesticides from residential and commercial landscaping, chemical spills, and construction runoff all contribute pollutants to the Sound and its tributaries. In addition, oil seeps and leaks and boat wastes are locally important. Widespread failures of on-site sewage disposal systems around Little Neck Bay have precluded bathing in the area.

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In Nassau County, pollution from New York City CSOs is an important factor in lowered water quality in Hempstead Harbor and Manhasset Bay, even though these bays are located approximately six miles to the east of the city. Urban runoff from surrounding uplands is also critical. In Oyster Bay, which is more sheltered from the waters of the Sound, water quality impairments are more a function of local activity than broader metropolitan effects.

Land uses are more varied in Suffolk County than in Nassau County. Western Suffolk County is characterized by moderately dense population, as exemplified by portions of the Huntington-Northport Bay and Port Jefferson Bay watersheds. In these areas, the primary source of pollution is urban runoff, and the most common effect is on shellfishing. Vessel discharge and concentrations of vessels in the harbors and bays are important secondary factors causing impairments. In Huntington Bay and Port Jefferson Harbor, municipal sewer outfalls contribute to diminished water quality. Population density decreases markedly eastward, as does the areal extent of the watershed that contributes to the Sound. There is also an increased proportion of open space, agricultural uses, and single family residences connected to on-site sewage disposal systems. Within enclosed harbors and embayments, water quality is affected by on-site sewage disposal systems, including cesspools located on porous soils.

New York City and most of Westchester County's population are served by high quality public water supplies from the New York City reservoir system, located outside the Long Island Sound watershed. Additions to the New York City system are unlikely to come from the Long Island Sound watershed. The Jamaica Water Supply Company, which supplies portions of Queens from wells, is also connected to the larger system. Despite a current gap of some 350 MGD between use (1,600 MGD) and safe yield (1,250 MGD), it is unlikely that water supply constraints will affect development in the area for the foreseeable future.

Drinking water supplies for Nassau and Suffolk counties are generally adequate, although supplies in a few isolated areas are limited due to saltwater intrusion. Contamination from surface activities has been a problem in the past in some areas. The combination of contamination and increased demand imply a long-term stress on the quantity of potable water available.

Nassau County derives nearly all of its drinking water from groundwater sources. Consumptive use is "currently at or above most estimates of the permissible sustained yield" of the aquifers of Nassau County (Water Resources Management Strategy, 1989). Use and overpumpage in Nassau and Queens counties have resulted in declining water tables in Nassau County. Because of the porous soils of the region, surface and groundwater flows are closely linked. Shifts in groundwater levels are reflected in surface flows, with resultant impacts on lake levels, wetland type and extent, and streamflows. Both the Great Neck and Bayville peninsulas have exhibited some of these problems.

Much of the Upper Glacial (surface) aquifer in Nassau County is currently unsuitable for drinking due to contamination from a variety of sources, including on-site sewage disposal systems, petroleum products, and gardening and agricultural chemicals. For those contaminated areas, current practice is to use one of the deeper aquifers, the Magothy or Lloyd, which are at present of high quality.

Water supplies in Suffolk County rely on groundwater. In general, there is an adequate supply of potable water from the Magothy aquifer, although supplies are limited in local areas in the eastern portion. The variability of adequate water supplies means that in some

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areas potable water availability is a development constraint. Suffolk and Nassau counties have designated special groundwater protection areas in recognition of the importance of maintaining quality groundwater recharge.

Groundwater is also the source for the public water supply of Fishers Island. Because of the possibility of threat to this source from overuse during drought, saltwater intrusion, or other contamination, the old surface water system is maintained as a backup supply.

Issues and Management Opportunities

The CCMP for Long Island Sound (1994) prepared through the LISS describes the extent, severity, and causes of several types of pollution in the watershed, with an emphasis on the problem of low dissolved oxygen levels, or hypoxia.

> Hypoxia is caused by both direct and indirect factors. Substances such as organic wastes, which consume oxygen as they degrade, may be directly introduced into coastal waters. In some areas, the quantity of these materials may be sufficient to decrease available oxygen levels in the water, adversely affecting marine life. For Long Island Sound as a whole, however, indirect factors are more important. Chief among these is nitrogen, the limiting nutrient for plant and algal productivity in the region. When nitrogen is added to Sound waters, it allows more rapid growth of these organisms than is normal. Upon their death and decomposition, oxygen is removed from the water column.

While hypoxia is a significant concern in Long Island Sound, several other water quality issues are also important. These include introduction of pathogens and toxic substances, floatables, sediment, and the like. In many cases, these water resource issues are geographically localized. Sheltered areas, such as embayments, are more likely to exhibit water quality problems than the open Sound. This is due to two factors: harbors and embayments are likely to be foci for concentrations of activities which produce pollutants, and the restricted flushing characteristic of such areas limits dilution of pollutants. Some of these issues may assume additional importance given the fact that much of the human use of the Sound is focused on the embayments and nearshore areas.

Pollutants Affecting Water Quality in Long Island Sound

Before discussing specific use impairments for Long Island Sound waters, it is critical to recognize that these impairments may be due to several types of pollutants (pathogens, toxics, nutrients, BOD or oxygen demanding wastes, aesthetic impairments, and sediment). Each of these types of pollutants presents problems which differ from the others.

Pathogens are disease-causing organisms. The pathogens most frequently encountered in water quality management include bacteria, such as *E. coli*, and protozoa, such as *Giardia lamblia* and *Cryptosporidium sp.* *E. coli* is an enteric (intestinal) bacteria usually not harmful in and of itself. Its importance stems from the fact that water can easily be tested for its presence, so it can be used to indicate the possible presence of other pathogens that are both more serious and more difficult to detect.

The category of **toxic substances** encompasses a broad range of materials that can have adverse impacts on the environment or human health. These range from organic chemical residues from manufacturing to metals washing into the Sound from street runoff.

The term **nutrients** refers primarily to phosphorus and nitrogen, two elements which are necessary for plant growth. In freshwater systems, phosphorus is usually the least available element relative to demand, while in marine systems, nitrogen is often the controlling factor.

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These pollutants are important because of their indirect impacts. They stimulate the growth of plants and algae, which can cause problems ranging from aesthetic impairments to "seaweed" which fouls boat propellers and makes swimming unsafe. When the accumulated plant mass decomposes, it extracts oxygen from the water, thereby reducing the level of dissolved oxygen in the water and leading to hypoxia.

Oxygen deprivation can cause mobile animals to leave an area, which is one reason hypoxic areas often have low numbers of fish. In more serious cases and for species which cannot flee, hypoxia can stunt growth or kill. The LISS has documented the extent of hypoxia in Long Island Sound (see, for example, Welsh, 1992). Map 9.0 shows the extent of hypoxia conditions in the Sound.

BOD, or Biochemical Oxygen Demand, refers to pollutants, such as sewage, that require oxygen for degradation. By stripping oxygen from the water column, these materials induce hypoxia. In extreme cases, when all oxygen has been removed from an environment, anaerobic conditions prevail. Because the organisms which flourish in such conditions are very different from those in aerobic conditions, much of the chemistry of the system changes. For example, the "rotten egg" smell found in areas of great decomposition, such as mud flats, is a result of anaerobic activity releasing hydrogen sulfide.

Aesthetic impairments to water quality can include a number of factors. Debris, such as paper and plastic trash from street runoff, can affect the aesthetic appeal of a water body. Similarly, even a small amount of oil or other petroleum product can create a sheen on the water surface. The aesthetic impairment can be separate from the other adverse effects of the same pollutant.

Sediment can cause water quality problems in several ways. Clearly, it can affect boating, both commercial and recreational, by blocking channels or reducing the depth of embayments. Less obviously, sediments can alter the composition of bottom substrate. Such shifts affect the ecological communities which will survive in a given area. Simple mechanical covering of non-motile organisms can also be a problem.

There are usually numerous activities which can generate any particular pollutant. Table 12 relates activities and the types of pollution typically associated with them. It should be noted that many of the activities listed in the table produce nonpoint pollution. In the past, attention was largely focused on discrete point sources, such as sewers and industrial discharges. As success in managing those sources grows, nonpoint sources contribute a greater and greater portion of the remaining pollution.

Water quality management for the Sound should not focus exclusively on only one type of pollutant. Additionally, there are multiple sources for any type of pollutant. A successful management scheme should therefore recognize the diversity of pollutants and sources which must be considered. Because actual pollution management focuses on activities, the remainder of this discussion will relate to source activities rather than specific pollutants.

Sources of Pollutants

In general, sources of pollution to water bodies may be classified as either point or nonpoint. Point sources, as the name implies, are discrete sources of pollution, the classic example being a pipe bearing sewage or industrial effluent. Nonpoint pollution enters the water body from more diffuse sources, such as runoff from fields. While there are many types of

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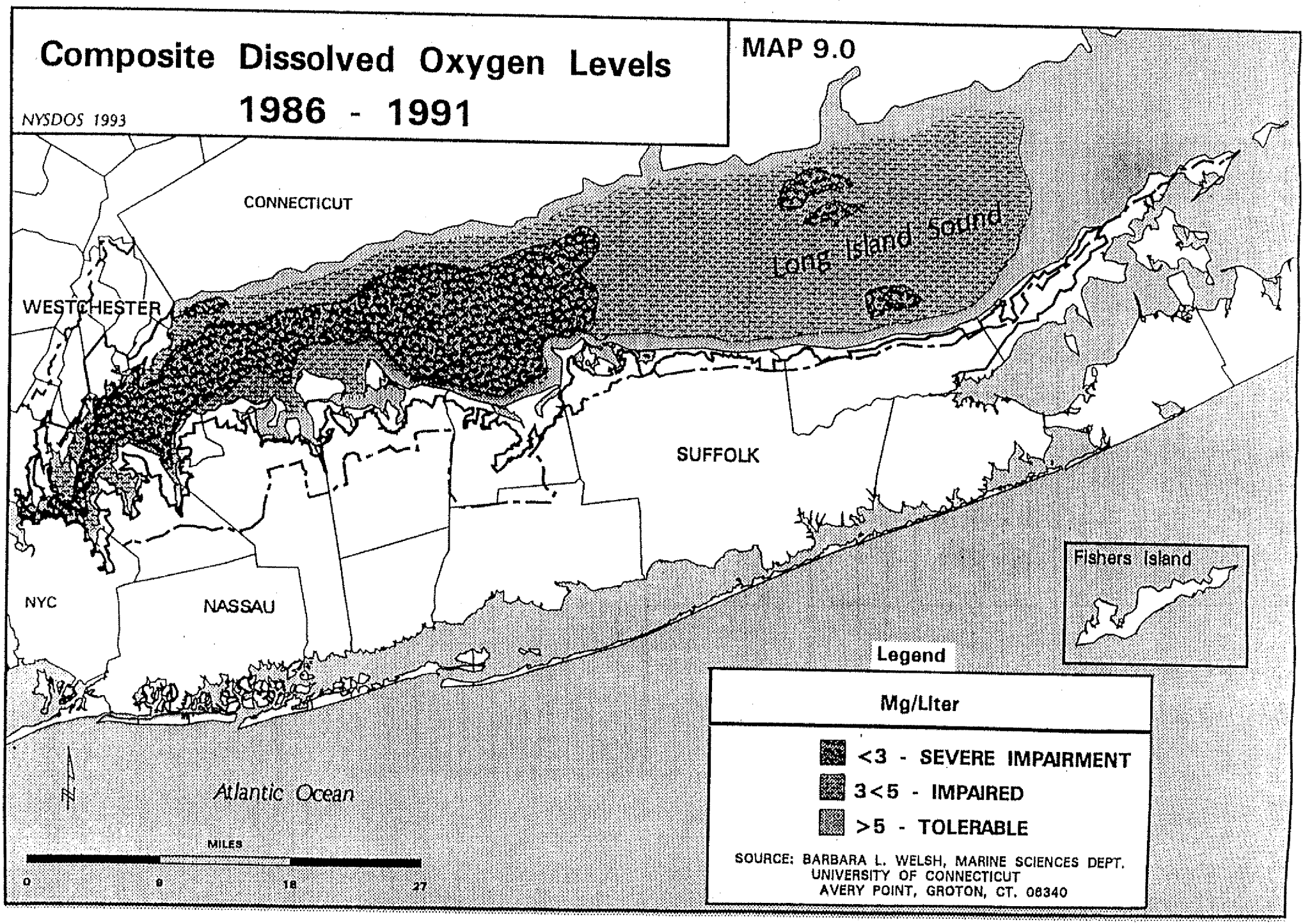
Composite Dissolved Oxygen Levels
1986 - 1991
NYSDOS 1993
MAP 9.0
CONNECTICUT
WESTCHESTER
Long Island Sound
SUFFOLK
NYC
NASSAU
Fishers Island
Atlantic Ocean
N
MILES
0
9
18
27
Legend
Mg/Liter
<3 - SEVERE IMPAIRMENT
3<5 - IMPAIRED
>5 - TOLERABLE
SOURCE: BARBARA L. WELSH, MARINE SCIENCES DEPT.
UNIVERSITY OF CONNECTICUT
AVERY POINT, GROTON, CT. 06340

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Table 12 Relationship of Type of Pollutant to Source of Pollutant

SOURCE OF POLLUTANT	TYPE OF POLLUTANT					
	Pathogens	Toxics	Nutrients	BOD	Aesthetics	Sediments
CSOs	X	X	X	X	X	X
Dry Period Overflows	X	X	X	X	X	X
Industry and Landfills	X	X	X	X	X	
Street Runoff	X	X	X	X	X	X
Development/Construction		X	X	X	X	X
Septic Systems (OSDS)	X		X	X	X	
Lawn/Garden Chemicals		X	X			
Boats/Marinas	X	X	X	X	X	
Oil/Petroleum Seeps and Spills		X		X	X	
Agriculture/ Commercial Horticulture		X	X			X

Table 13 Municipal Wastewater Treatment Facilities

NASSAU AND SUFFOLK COUNTIES	DAILY AVG FLOW (MGD)	NEW YORK CITY	DAILY AVG FLOW (MGD)	WESTCHESTER COUNTY	DAILY AVG FLOW (MGD)*
Belgrave	1.7	Wards Island	260	Blind Brook	5.0
Glen Cove	4.8	Hunts Point	125	Mamaroneck	18.0
Great Neck	2.5	Bowery Bay	60	New Rochelle	19.1
Port Washington	3.8	Tallman Island	150	Port Chester	4.8
Huntington	2.7				
King's Park	0.7				
Oyster Bay	1.5				
Stony Brook/ Port Jefferson	2.1				
Greenport	0.4				
Northport	0.4				

* Monthly Average, January 1993 Source: LIRPB, NYSDEC

pollution sources that have both point and nonpoint characteristics (stormwater runoff from roads which is channeled into a gutter, for example), the general distinction is useful.

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Point Sources

Pollution control has historically focused on point sources, because these sources are easily determined and the effects are often readily apparent. Since the passage of the 1972 Federal Water Pollution Control Act Amendments (PL 92-500), remarkable progress has been made in controlling pollution from point sources. Despite this progress, more remains to be done. Within the Long Island Sound watershed, wastewater treatment plants constitute the most important type of point source. Rapid residential growth over the past 30 years has been accompanied by a shift from individual septic systems to community sewerage systems. While there are isolated sewerage systems in the more rural and undeveloped areas of eastern Suffolk County, the heavily developed western portion of region is completely sewered. The distribution of wastewater treatment facilities is shown on map 1.0, Regional Infrastructure, and their average daily flow outlined in table 13. The inadequacies of current municipal wastewater treatment systems fall into three categories: dry weather overflows, combined sewer overflows, and treated effluent. Each of these is a problem in the Long Island Sound watershed.

Dry weather overflows occur under routine operating conditions, when the wastewater treatment plant's capacity is exceeded. In extreme cases, this can result in the bypassing of a portion of the raw sewage around the treatment facility. More commonly, it means that the plant treats more wastewater than optimal for its design. As a result, the quality of treatment is reduced, with less effective pollutant removal.

A related but separate problem is that of **combined sewer overflows**, or CSOs. Many communities use only one set of collecting sewers for both wastewater and stormwater runoff. For these systems, wastewater treatment capacity may be more than adequate under dry period conditions; however, when rainfall leads to stormwater runoff, the volume entering the treatment plant increases markedly, far exceeding the capacity of the facility. Under these circumstances, a portion of the flow is diverted around the plant, reaching receiving waters without treatment. The original justification for this practice was twofold: combined systems are far less expensive to construct than separate systems, and the diversion only occurs when stormwater dilutes sewage, so that the pollutant levels are relatively low. Unfortunately, stormwater itself is often severely contaminated, so that the pollutants in CSOs are significant additions to total pollutant loading of receiving waters. In the Long Island Sound area, CSOs are found only in New York City.

Finally, even when dry or wet period overflows are not a problem, secondary **treated effluent** still constitutes a significant pollutant for Long Island Sound. Secondary treatment is quite effective at achieving the goals for which it was designed, principally reducing pathogens and BOD; nevertheless, the level of nutrients in the effluent is not greatly reduced. As discussed earlier, the presence of large amounts of nutrients, particularly nitrogen, allows rapid growth of algae and plants. Their subsequent decay strips oxygen from the water column, leading to hypoxic conditions. Removal of nitrogen from wastewaters requires tertiary or advanced treatment, often through biological nitrogen removal, or BNR. While effective, BNR is a significant additional cost, both for initial construction and for maintenance and operation.

All three of the preceding problems with public wastewater management have been addressed in the LISS CCMP. To deal with the overall hypoxia issue, the CCMP has proposed a phased approach to nitrogen management in the Sound watershed, first limiting nitrogen inputs to "no net increase," and then progressively reducing nitrogen loadings. The CCMP

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has identified a strategy for evaluating and implementing BNR and other nitrogen removal techniques for point sources.

The no net increase policy has led to the decision to cap nitrogen loading from 18 municipal facilities in the Long Island Sound region: (CCMP, 1992)

Belgrave	Wards Island	Port Washington	Blind Brook
Glen Cove	Bowery Bay	King's Park	Port Chester
Great Neck	Hunts Point	SUNY Stony Brook	Port Jefferson
Great Neck East Shore	Tallman Island	New Rochelle	Newtown Creek
Huntington	Oyster Bay	Mamaroneck	Red Hook

It should be noted that the no net increase policy does not imply a freeze on further development. Instead, increases in nitrogen removal efficiency will allow additional development.

Progress is being made in improving wastewater treatment plants along the Sound. In New York City, the recent ban on ocean disposal of sludge has led to process modifications in the city's treatment plants, resulting in an increase in nitrogen levels in effluent. The city is taking steps to address this problem through BNR capacity expansions and altering treatment processes to increase sludge age, thereby reducing nitrogen levels in effluent. The Tallman Island facility, for example, is expected to have BNR fully operational by 1995, the Hunts Point facility in 1995, and the Red Hook facility in 1996. In Westchester County, the Blind Brook plant is being retrofitted with BNR technology on a pilot basis. In addition, plants that are currently undergoing expansion or upgrading are to consider including nitrogen removal capacity. These plants include all other Westchester County treatment facilities, Wards Island, and Newtown Creek.

In addition, the New York City Department of Environmental Protection (NYCDEP) has committed to a demonstration project to treat the centrate resulting from sludge dewatering. Assuming the pilot project is successful, NYCDEP anticipates development of a sludge centrate treatment facility by the year 2000, at either Hunts Point or Wards Island. New York City has also committed to a CSO abatement plan, with an estimated cost of $1.5 billion, to take place over the next 10 to 15 years.

These and other activities focusing on point sources, which are detailed in the CCMP, are expected to reduce total nitrogen loading to the Sound by about 8 percent by 1995 and about 11 percent after full implementation.

Nonpoint Sources

Total nitrogen loadings to the Sound can be divided into natural and human-caused (anthropogenic). The natural load accounts for approximately 43 percent of total loadings. The category of anthropogenic sources is divided into point and nonpoint sources. Even with full control of the large point sources, significant water quality impairments are likely to remain, because of the multiplicity of smaller sources. The CCMP, for example, estimates that while point sources constitute more than half the total anthropogenic loadings, nonpoint sources directly to coastal waters and to tributaries account for an additional 16 percent. A portion of the loadings across the eastern and western boundaries of the Sound are also of nonpoint origin.

Considering only nitrogen from human activity within the basin, nonpoint sources account for 21 percent of the total. Successful management of the Sound, therefore, must include

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consideration of nonpoint sources, which are individually smaller contributers than point sources but are far more numerous. Also, successful Sound management should consider the impact of sources on localized environments such as enclosed bays and harbors. In many such instances, nonpoint sources are critical.

Urban Nonpoint Pollution

For much of the Long Island Sound watershed, nonpoint urban pollution is the most significant source of contaminants (see appendix 3). In this context, the term "urban" is usually taken to be synonymous with "development." Thus, such sources as on-site sewage disposal systems (septic systems and cesspools) are classified as urban sources. Like industrial contamination, the term "urban runoff" includes a wide range of contaminants and contaminant sources. For convenience, they can be divided into several major categories: **street (including roads, bridges, parking lots, etc.) runoff, construction, on-site sewage disposal systems, industry or activity specific problems, and lawn and garden chemicals**.

Street runoff is a problem in virtually every developed area of the watershed, creating quantity and quality issues. Streets, parking lots, and driveways are essentially impervious surfaces. Therefore, infiltration to groundwater in an area decreases as paved surfaces are developed and extended. Runoff to receiving waters is much more rapid than under natural conditions. These two factors combine to mean that, relative to pre-development conditions, streets cause both greater runoff and a greater peak flow of runoff. The impacts of greater and more rapid runoff include scouring of streambeds due to higher flows and alteration of salinity regimes in estuaries. Each of these effects can be significant to certain species.

Street runoff also affects water quality. Rainwater flowing from streets carries accumulated debris and detritus from the street surface. These contaminants include aesthetic contaminants, such as floatable materials and other trash, as well as chemical contaminants, such as oils and metals. Pathogens and sediments are also entrained. In areas using de-icing materials in winter, significant contamination can occur from street runoff.

Several approaches exist for dealing with the problems presented by street runoff. It is possible to design new streets to minimize runoff problems. This can be done through the use of appropriate initial siting considerations, buffer strips, settling and infiltration basins, proper maintenance and management, and a number of other techniques.

Although it is more difficult and often more expensive, it is also possible to significantly reduce problems from existing streets. In some cases, retrofitted buffer strips or other "hard" technology can be incorporated. In other instances, shifts in management practices such as increases in frequency or efficacy of street sweeping, or decreases in amounts of de-icing materials applied, can result in marked improvements. A number of specific approaches for dealing with street runoff are listed in volume 1 of the Long Island Sound Coastal Management Program.

The term **"development and construction activities"** focuses on the period in which construction is proceeding. Because construction typically involves disturbing the vegetative cover of the land, it is a period of high erosion potential. Also, if care is not taken, revegetation can be made more difficult once construction is completed (as, for example, by the removal or burial of topsoil and the exposing of subsoils). Finally, a variety of hazardous and toxic materials are routinely used in construction, and if mishandled, can enter waterways.

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Pollution problems from construction can be minimized if basic principles are kept in mind. Clearly, initial siting is a critical factor in eventual pollutant loadings. Certain areas, such as steep slopes, are much more problematic for development than are other areas. By minimizing the area disturbed, reducing new impervious surfaces to a minimum, and stabilizing disturbed areas as rapidly as possible, erosion losses can be minimized. Several recommendations regarding management of construction activity are detailed in volume 1 of the Long Island Sound Coastal Management Program.

On-site Disposal Systems, or OSDS, have been noted as contributing to water quality problems, including nutrient loadings, in several areas of the Long Island Sound watershed, ranging from Guion Creek and Tibbetts Brook in Westchester County to Oyster Bay Harbor in Nassau County and nine segments in Suffolk County, including Port Jefferson Harbor (DEC, 1991). In some cases, these problems arise due to inadequate construction or inappropriate siting. Problems can also arise from inadequate maintenance or from improper use. For example, many individuals do not realize that traditional septic systems require occasional pumping to remove solids that settle out of the waste stream. Without periodic pumping, the solids build up to a point that storage capacity in the tank is reduced, thus reducing residence time. After serious build-up, solids begin to flow into the leach field or cesspool, clogging it. The result is a failed septic system, which usually must be replaced.

Another problem associated with OSDS is their improper use as a disposal method for chemicals, waste oils, and so on. Because these systems rely on biological action for waste treatment, chemicals that kill the microorganisms present can drastically reduce the efficiency of the system. Even if they do not harm the microorganisms, such wastes may not be broken down, instead passing through the system and leaching into groundwater supplies.

To minimize problems associated with OSDS, management concerns should focus on three areas: initial siting and design, routine maintenance, and avoidance of improper use. Suggested guidelines for each of these areas may be found below.

Industry or activity specific pollution problems are highly variable. For example, the transport and storage of petroleum products present a number of challenges in environmental management. Proper design and operation of industrial and storage facilities can minimize but not eliminate pollution from these sources. Thus, in addition to routine maintenance, provisions must be made for dealing with the unexpected spill, equipment failure, or other significant pollution event. In addition, some pollution from these sources will occur with routine operation, as seeps and small leaks cannot be detected and stopped instantaneously.

Excessive use of fertilizers and chemicals for lawns, golf courses, gardens, and other greenspaces can also result in urban nonpoint pollution. Bathing in Lake Isle, in Westchester County, is impaired by aquatic vegetation which thrives because of excessive use of fertilizers on lawns and golf courses. Similarly, fishing is impaired at Mead Pond (DEC, 1991). The direct pollutants that result from use of fertilizers and chemicals include nutrients, such as nitrogen and phosphorus, and various pesticides.

Management of this problem, like that for many other nonpoint problems, is complicated by the fact that many sources are often involved, with each single source representing a small portion of the total problem. In this instance, additional public education holds great promise for management, because a reduction in fertilizer use can be accomplished without adversely affecting lawns and will be less expensive to the landowner. While reducing chemical use is less simple, it appears that public education may also be effective.

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Boats and Marinas

Boats and marinas contribute a wide range of pollutants that affect Long Island Sound. For example, disposal of human wastes from boats contributes to problems in several enclosed areas in the Sound watershed (Little Neck Bay, Newtown Creek, Huntington Bay, Mount Sinai Harbor, Mattituck Inlet, Port Jefferson, and West Harbor). The discharge of sewage from boats introduces microbial pathogens into the environment. These organic-rich wastes can increase biological oxygen demand, resulting in decreased oxygen concentrations in poorly flushed water bodies. Boats can be a significant source of coliform bacteria, particularly in areas with high boat densities and low hydrologic flushing. Chemical additives, such as chlorine, formaldehyde, and zinc compounds are often used in boat sewage disposal units. Zinc has been reported to be lethal to fish and many aquatic plants, and is known to bioaccumulate (Clean Vessel Act, section 5605, Technical Guidelines and Information Packet, U.S. Fish and Wildlife Service, 1993). Boat repair and maintenance and fueling operations also release pollutants.

Marina-based pollution can be reduced through incorporation of nonpoint pollution control considerations when siting and designing new marinas. However, additional strategies may be needed to deal with pollution from existing marinas. Because marinas are usually placed in protective embayments, flushing tends to be limited. Therefore, any pollutants which do reach the water are less likely to be dispersed than would be the case in open waters. Appropriate siting and design of new marinas will allow adequate flushing from tides or currents, thus limiting the buildup of pollutants and the development of anoxic or hypoxic conditions. In some areas with erodible shorelines, vegetative buffers or, in certain circumstances, structural methods, such as revetments or riprap, may be used. New marina development should also include measures to control stormwater runoff, petroleum spills or leakage, and boat wastes in site planning and design.

Numerous opportunities exist for pollution management at existing marina facilities. Assuring adequate oil spill response capacity and the provision of disposal sites for fish wastes are examples of management approaches which focus on specific types of pollutants encountered at marinas. More generally, nonpoint management for existing marinas should address disposal of chemicals used in boat maintenance and repair, as well as such potentially toxic wastes as those resulting from hull scraping.

Boating and marina activities, while contributing to water pollution problems, are only rarely the sole source of pollution to an area. Thus, boat and marina management should be considered as a part of a larger program aimed at addressing the various sources of pollution affecting water quality in the region.

Agriculture and Commercial Horticulture

Agriculture is an important part of many communities on Long Island, especially in the eastern portion of Suffolk County. Over the past few decades, the predominant types of agriculture have shifted, usually to more high-value crops which require the relatively mild climate and sandy soils afforded by eastern Long Island. For example, the number of acres devoted to potatoes on Long Island decreased from 19,300 to 6,600 between 1982 and 1991. (NYS Department of Agriculture and Markets, 1992). This shift is continuing.

Currently, the most significant types of agriculture in the New York portion of the Long Island Sound watershed are grapes (mostly for wine production) and commercial horticulture, producing sod and ornamentals for landscaping. These activities present some specific challenges with respect to water resource management.

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In general, little fertilizer is used in the production of grapes for wine, but fungicides are a concern. There is currently no indication of any adverse water quality impacts from fungicide use; however, given past experience with agricultural contamination, particularly the use of aldicarb, or Temik, to control the Colorado potato beetle, routine pesticide precautions should be followed. Since grape production is likely to grow significantly in the near future, management of fungicides is important. Unlike some parts of New York, erosion is not a problem in Long Island viticulture because of the mild climate and the relative availability of easily worked soils with little slope.

Commercial horticulture also presents no obvious erosion problems at this time. Potential problems lie in the often heavy use of fertilizers and pesticides to assure products that will command a high price. Excessive fertilizer use can lead to nutrient loading of coastal waters, with at least local problems of cultural eutrophication. The information needed to calibrate fertilizer and pesticide applications to optimal levels is readily available. To a large extent, then, this problem can be addressed through education. On a long-term basis, education aimed at the general public can also be important. By encouraging the use of indigenous species or at least those which need minimal amounts of fertilizers and pesticides, water contamination can be reduced both from horticultural operations and from landscaped areas.

Hydromodifications

Alterations in hydrologic regimes through such activities as dredging and dam construction is termed hydromodification. In Long Island Sound, only dredging is significant.

Impacts from dredging are typically felt in three ways: the intended clearing of a channel, reentrainment of contaminants in the water column during dredging, and the effects of dredge spoil disposal. In some instances, it may be possible to use clean spoils for beach nourishment in areas where such is needed. The importance of reentrainment in the water column during dredging varies with such factors as the type of contaminant, local currents and water circulation patterns, and extent and frequency of dredging.

Summary

The preceding section discussed the varied categories of water resource problems relevant to the Long Island Sound watershed. The problems themselves form the issues which must be addressed if water quality in the Sound and its embayments is to be protected and improved.

To summarize, the point source most affecting water quality in the region is CSOs from municipal wastewater treatment facilities. This source is being partially addressed. New York City's CSO Abatement Program is a significant step toward dealing with the issue throughout the Sound. Similarly, improvements to wastewater treatment facilities to deal with dry weather overflows and inadequate treatment are progressing. While more remains to be done to correct problems with CSOs and wastewater treatment facilities, the necessary actions are clear and are fully addressed in the CCMP.

Control of point sources alone will not solve all the water quality problems in the region. Nonpoint sources also seriously affect water quality. Urban runoff, which is not well managed, is one of the most significant sources of pollution to the Sound. Significant improvements in water quality, particularly for communities centered on embayments, will be contingent on conscious efforts by local communities to manage new development and incorporate urban runoff management into their activities. For the Sound watershed, water quality impacts from agriculture and commercial horticulture uses are not presently of critical

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importance; however, because of Long Island's porous soils, groundwater contamination from activity occurring outside the watershed must be considered a possibility. Special activities, such as those found at marinas and fuel stations, can present some specific problems with respect to water resource management. These problems can be addressed if care is taken in siting new facilities and in maintaining both new and existing ones.

Management Approaches for Water Quality Improvement

The preceding issues on the impact of nonpoint pollution on water quality are addressed in the CCMP. They will be further addressed under three additional programs, the Stormwater General Permit portion of the State Pollution Elimination Discharge System Program, the Section 319 Nonpoint Source Program, and the nonpoint source pollution control elements of the Coastal Management Program. The first is aimed at managing runoff from a wide range of facilities and land uses. The 319 program was established under the Clean Water Act and allows states to address nonpoint pollution problems by developing management programs, which can be funded through grants from EPA. In general, those activities and land uses not managed under the stormwater program will be managed through the nonpoint source pollution control elements of the Coastal Management Program.

Coastal Nonpoint Pollution Control

As noted earlier, as point sources of pollution are controlled, nonpoint pollution makes up a greater proportion of the total remaining pollution load to a system. The Priority Water Problem listing contained in appendix 3 demonstrates that nonpoint pollution of Long Island Sound waters is a problem that must be addressed, if water quality is to be substantially improved.

There are several major components of a coastal nonpoint pollution control program. First is the geographic area affected. Because water quality is affected by land use, the coastal nonpoint program must address land uses that can affect coastal waters. For Long Island Sound, this means that the program affects the entire Sound watershed rather than merely the riparian areas or the existing coastal boundary.

Secondly, because of the interrelationship of land use and water quality, the Department of State and the Department of Environmental Conservation are partners in controlling coastal nonpoint source pollution.

A third critical component of a coastal nonpoint program is a systematic approach. Addressing nonpoint source pollution control on a watershed basis ensures that appropriate management practices will be applied comprehensively. Most existing programs aimed at nonpoint pollution control are site or project or source specific. This does not guarantee that the wide spectrum of sources will be adequately addressed.

Probably the most important aspect of a coastal nonpoint program involves the assumptions made in determining pollution management policy. An effective program needs to redefine the traditional strong linkage between cause and observed water quality effect. This redefinition is critical, because it is cumulative rather than individual impact that is important for the many individually small sources. As the impact of a single source, such as a single malfunctioning septic system or a single parking lot, becomes smaller, it is correspondingly difficult to detect and measure that impact on the environment. As Weinberg (1972) noted, "No matter what the environmental insult, to measure an effect at extremely low levels usually requires impossibly large protocols." This principle is obvious in our everyday life.

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The addition of a single car to an already crowded highway has an impact on total traffic, but that effect is likely to be too small to notice. By contrast, the addition of many vehicles, as happens when a parallel road is closed for repairs, is immediately noticeable.

This principle means that, for individually very small sources, determining the effect on Long Island Sound, or even a stream tributary to the Sound, is effectively impossible. The coastal nonpoint program addresses this problem by making three assumptions: (1) existing information is sufficient to demonstrate that a certain activity has pollution potential, (2) there is evidence that certain alternatives are available to reduce the potential for pollution, and (3) the results of detailed studies can be generalized to most situations.

It is clear that the first assumption is appropriate. Despite the difficulty in linking, say, fertilization of one lawn with nutrient enrichment of a bay, we can confidently show that the enrichment is the result of many lawns being overfertilized. The second and third assumptions are closely related. For each of the pollution sources thus far discussed, numerous detailed studies have been conducted which show the effect of alternative management practices. For example, many detailed studies have addressed the topic of street runoff. A particular study might evaluate the effectiveness of a particular approach, such as regular street sweeping on pollution loadings. These studies as a whole demonstrate that alternative approaches can be used to reduce pollution loadings to water bodies and that, while there are limitations, the results of the individual studies can be generalized.

A coastal nonpoint program, therefore, exemplifies the next step in pollution management in which pollution-generating activities are managed, even though it is difficult or impossible to demonstrate the importance of each single pollution instance. The program will manage such activities in the coastal watersheds, regardless of where they occur.

A coastal nonpoint program recognizes that it may also be necessary to apply additional management measures to reduce pollution from sources which either (1) occur relatively rarely and are therefore not found throughout the coastal watersheds or (2) cumulatively increase pollution loadings in an area to the extent that watershed-wide measures will be inadequate to achieve water quality goals. An example of the latter case would be a small embayment which is severely impacted by septic systems, roads, and lawn fertilizers. If the flushing capacity of the system is too small, application of the various management techniques used watershed-wide may still not reduce pollution loadings to an acceptable level. In such a case, it may be necessary to apply more stringent standards.

Thus, while a coastal nonpoint program will affect the entire Sound watershed, site specific conditions may mean that certain areas will be subject to additional management.

Developing a Nonpoint Pollution Management Strategy

One fundamental difficulty with developing a nonpoint pollution management strategy is that of determining the area of interest. Those areas which directly load into coastal waters must be addressed. Depending on the type of pollutant, sources which are physically removed from the coast may also be important.

The nonpoint pollution management program proposed for Long Island Sound should be applied to the entire watershed on Long Island and Westchester County. There are two reasons to support the application of a management program to the watershed. First, the relatively compact watersheds characteristic of the area mean a short travel time from headwaters to the Sound. A short travel time limits the efficacy of natural processes in

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reducing pollutant loads (of course, some pollutants, such as salt or certain metals, are "conservative"; they are not broken down readily by physical, chemical, or biological factors in the environment).

The problem of groundwater contamination and subsequent transport to coastal waters is of major importance for Long Island. Although groundwater flow allies roughly with surface water drainage patterns, human impact on the Long Island aquifers has, in places, significantly altered natural flow. Because of the highly porous soils characteristic of Long Island, groundwater contamination must be considered along with surface water contamination.

Specific Approaches for Nonpoint Pollution Sources

Agriculture

Each owner or occupier of agricultural land in New York State is required to have applied to the appropriate Soil and Water Conservation District for a soil and water conservation plan. Precise figures on the number of farms complying with this requirement are not available. In general, for the types of agricultural operations found in the Sound watershed it is estimated that the compliance rate is probably below 80 percent. Better compliance with the Soil and Water Conservation District Law is needed.

Currently, soil and water conservation plans focus almost exclusively on erosion and sediment control. The plans could be made more useful by expanding their scope to consider nutrient loading and the capacity of soils to retain applied nutrients. Additionally, the plans should incorporate pest management plans which consider the possible impacts of various pesticide management strategies, including economic and ecological factors. The impact of irrigation on water quality and quantity should also be included in plans for farms which irrigate.

Even with these expansions, it is clear that the soil and water conservation plans are inadequate unless: (1) participation is increased, and (2) the plans are in fact implemented. Currently, while the plans are formally required, there is no mechanism to assure participation. Neither is there any requirement that the plans be implemented. (It should be noted that some federal agricultural programs require participants to have an approved plan).

Urban and General Development

Much can be done to reduce the impacts of urban nonpoint pollution, both through the use of improved design criteria for new construction and activities and remediation for existing situations. New construction should be designed to maintain post-development runoff of total suspended solids (TSS) at pre-development levels. Additionally, peak runoff rate and average volume of runoff should be as near as practical to pre-development levels.

One important activity aimed at addressing urban runoff problems is an intensive study currently being designed, which will implement several best management practices (BMPs) for urban pollution control and monitor their effectiveness in a sub-watershed in Westchester County. This study is expected to be completed in 1995.

On-site disposal systems. On-site sewage disposal systems (OSDS), such as septic systems and cesspools, must be managed more intensively than in the past. As noted in the analysis section, management of OSDS can be divided into programs dealing with new systems and those focusing on existing systems.

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For new systems, better pollution control can be achieved through several approaches. For any given situation, it should first be determined that an OSDS is the appropriate technology. For areas that have excessively porous soils, like much of Long Island, a more appropriate decision may be to hook into existing wastewater collection systems, if possible. This option depends on the community addressing both capacity limitations and the need for higher levels of treatment at wastewater treatment facilities. Still, it is appropriate to question whether OSDS should be permitted if there is ready access to an adequate sewerage system. For new construction, Suffolk County requires connection to a sewerage system, if possible. There is no parallel requirement that existing properties with OSDS hook up to sewerage systems where such hookups are available. For areas not served by sewers, density restrictions are the primary means of limiting groundwater contamination. While such density restrictions address groundwater nitrate contamination, they may in some instances still allow sufficient nitrate into groundwater that groundwater underflow into embayments becomes a significant nutrient source for the embayment. Further information is needed to determine the extent of this problem.

If access to a sewerage system is not available, other options to the traditional septic tank and cesspool or leach field should be available. Because most alternative systems raise other issues, such as maintenance and disposal of composted waste, they should not be considered a panacea. However, the flexibility allowed under the pending revised edition of the Department of Health's (DOH) Individual Wastewater Treatment Design Handbook should be explored by local health departments. Such issues as maintenance may require the use of innovative approval approaches, such as the requiring of a performance bond or regular certification at homeowner expense. Health departments should reevaluate alternative systems in light of recent research by such groups as the EPA-funded Small Flows Clearinghouse and other impartial sources. Such reevaluation may lead to more flexibility in the use of alternative wastewater treatment systems. Flexibility in OSDS design may require mechanisms which assure adequate maintenance, such as the formation of waste disposal districts or requirements for maintenance certification. Such maintenance compliance programs may legitimately be required in order for these alternative systems to be acceptable.

Finally, for new construction using a traditional on-site system, care must be used in design and siting. Given the highly porous nature of most soils on Long Island, it may be appropriate for county health departments to re-examine standards, such as depth to groundwater. Several towns on Cape Cod, for example, have increased the required depth to groundwater to five feet from the statewide minimum of four feet. Care must also be taken to ensure that percolation tests are performed properly. Absent adequate specific information regarding seasonal fluctuation in water table, percolation tests should be done only during high water table periods. Dry period tests should either be inadmissible or subject to later verification. In areas with nitrogen loading problems, health departments should require OSDS to have additional denitrification capacity. Among the options known to achieve at least partial denitrification are constructed wetlands, sand, and anaerobic filters. In extreme cases, if the decision is made to allow construction, it may be necessary to rely on such systems as holding tanks, which are periodically pumped. Because of the difficulty in assuring proper maintenance of such systems, it may be more appropriate to avoid construction on sites which are not amenable to more traditional systems.

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For existing OSDS, there is a shift in emphasis to maintenance. Because the traditional system is designed to be low maintenance, it is frequently assumed by homeowners to be zero maintenance. There are several solutions to this problem.

Better education on the part of the landowner is needed. Because regular maintenance will over the long run reduce costs by prolonging system life, many homeowners would perform such maintenance if they knew it was needed. However, OSDS management is not likely to be a high priority for many homeowners. In addition to the usual rationales for deferred maintenance, OSDS are typically designed to be inconspicuous, and rarely draw the homeowner's attention if they are functioning well.

One way to deal with this problem is through the development of what is essentially a utility. Communities can set up an authority with the responsibility of overseeing or performing maintenance of OSDS. This should include both routine maintenance, such as tank pumpage, and repair or replacement of failing systems or components. In return, all members of the community are billed regularly to support the utility. This approach has been used successfully in many areas. Among the variations on this approach is one in which the municipality formally purchases the OSDS, assumes complete control over operation and maintenance and rents the system. The variations are alike in having a similar goal: some entity, public or private, has a direct and immediate interest in maintaining OSDS.

Construction activities. During construction, vegetative cover is typically removed, increasing erosion potential. Several management practices can reduce erosion, including: minimizing the construction footprint; limiting construction on steep slopes; and staging construction in phases, so that the entire area is not subject to maximum erosion. In addition, pedestrian and vehicular traffic should be routed to avoid disturbing newly planted vegetation, allowing it time to become established. Natural vegetation, which is to remain, should be protected through the use of fences or other means. Upon completion of construction, areas should be stabilized with seeding or mulch mats. It may be appropriate to require that topsoil be stockpiled during construction for later use in site stabilization. Final grading of sites should take into account the erosive potential of steep slopes and channeled waters. Finally, erosion control structures, such as sedimentation basins and filter strips, may be appropriate. While not every one of these practices is applicable to every construction site, local governments should use their authority to require the development and implementation of a construction plan which considers erosion control. As a guideline, total suspended solids from a site should, after stabilization, be reduced by 80 percent, and post-development runoff should not exceed in peak flow or average flow pre-development conditions.

In addition to erosion control, construction activities should also be subject to control of inappropriate use and storage of such toxics as pesticides and petroleum products. This should also be part of a required construction management plan.

Existing development. Restriction of future development will not by itself solve the water quality problems presently facing the Sound system. It is imperative to reduce pollution from existing sources. While this is more difficult than dealing with new sources, it is still possible to achieve notable results. Pollution reduction opportunities include, but are not limited to, improvements to existing urban runoff controls, shifts in management (e.g., reduction in fertilizer and pesticide use), and sites for installation of runoff controls. Such opportunities should be assessed, prioritized, and implemented in direct government actions. In addition, pollution mitigation should be required as a condition of state and local approvals

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for renovations or upgrades to uses. For example, a business seeking expansion might be granted approval only if the expansion project includes addressing runoff problems from existing as well as new parking lots. Existing anti-litter programs and regulations should be enforced. Where appropriate, focused programs to remove litter should be instituted and maintained.

Roads and bridges. New construction of transportation facilities, such as roads and bridges, can be done in ways which minimize pollution potential. Care in siting, for example, can minimize the opportunity for pollutants from road runoff to impact critical areas. Similarly, bridge siting and design can minimize impacts as varied as changes in circulation patterns and runoff directly into water bodies. In general, natural protective features should be avoided and land disturbance should be minimized.

As with other projects, road and bridge construction should be undertaken with appropriate safeguards to minimize land clearing, sediment losses, and erosion. One way of achieving this objective is to require the development and implementation of an erosion control plan, whether the activity is undertaken by public or private authorities.

Like other existing development, it is possible in many cases to reduce pollution loadings from existing roads and bridges. Stabilization of slopes, if possible with vegetation, can reduce peak runoff and erosion. Use of well adapted species on buffer and median strips can minimize erosion as well as reduce maintenance needs and costs. Regular street cleanup can reduce the flow of debris during storms. Such pollution detention devices as oil/grit separators should be properly installed and maintained.

Marinas. Like other urban development, management of pollution from marinas can be divided into that affecting the siting, design, and construction of new facilities and retrofits of existing facilities. While there are only limited opportunities for the siting of new marinas in much of the Long Island Sound shore, some basic principles can quickly be enumerated.

New marinas should be sited where flushing is adequate, whether through tidal or current action. Care must be taken in siting new facilities or expanding existing ones to ensure that impacts on important habitats (e.g., shellfishing beds, rare or endangered species habitat) are minimal or avoided. If shoreline erosion is a potential problem, it should be addressed in the siting and design phase. Stormwater management, particularly from areas likely to produce toxic substances, such as hull maintenance areas, is critical. Similarly, design should allow for protection against fuel spills and easy containment and cleanup of spills which do occur. Finally, new marinas or significant expansions should be required to include boat pumpout facilities, available to the public at a minimal cost.

For existing marinas, many of the same considerations apply. It is, however, more difficult to achieve the same level of pollution control in retrofitting as is achievable for new designs. Despite this, several actions can be taken which will minimize pollution from marinas.

Entry of debris into water should be minimized through solid waste management. Such approaches as requiring regular cleanup of hull maintenance areas and restricting maintenance to specified areas will aid in obtaining this objective. Adequate disposal facilities should be available, including containers for recycling where applicable. Use of pollution reducing technology, such as "dustless" sanders (with vacuum attachments), should be encouraged if not required.

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Existing regulations regarding control of petroleum products should be strictly enforced. Marinas must have adequate oil spill control equipment, personnel should be properly trained in its use, and where applicable, signs should be displayed instructing in use of such equipment.

Boat cleaning in the water should be performed in ways and using materials which are not likely to increase pollution, either through direct toxicity (e.g., harmful solvents) or through such secondary impacts as stripping paint from hulls.

Adequate pumpout facilities should be available, based on the number of vessels using an area. In some areas, this may mean that several marina operators could together develop such a facility. In other areas, it may be appropriate for marinas each to have facilities.

For areas where significant amounts of fish waste are generated, specific actions to reduce water pollution include education and restricting fish cleaning to specified areas with adequate disposal facilities.

Hydromodifications

As noted above, the most important hydromodification activities with respect to water pollution control for Long Island Sound are those concerned with dredging. Clearly, all proposed dredging activities must meet several standards before they can be approved.

For the Long Island Sound watershed, dredging activities should minimize undesirable impacts, such as reentrainment of contaminants in the water column. For existing dredged channels, management plans should focus on opportunities to improve the physical and chemical characteristics of the water in those channels. For example, in some instances channel depth can be reduced, because smaller boats are using the waterway.

Streambanks that are likely to be subject to erosion, causing significant nonpoint pollution, should be stabilized. When such stabilization is needed, there should be a strong preference for vegetative stabilization rather than the "hard" technologies.

Watershed Protection Programs

In addition to specific requirements for specific sources, watershed and sub-watershed protection plans are needed. For example, while it might be possible to develop a site adjacent to a critical habitat and still meet all specific guidelines listed above, the undisturbed site may be valuable as, say, a streamside buffer. Therefore, governments should work together on a sub-watershed basis to develop watershed protection programs which articulate water quality goals for the sub-watershed and the approaches which will be used to achieve them. Among the considerations the sub-watershed plans should include are: avoiding, where practicable, disturbance of particularly erosion prone areas, such as bluffs; the preservation of areas providing water quality benefits, such as wetlands and buffer zones; and site development which minimizes impacts on water quality and ecosystem integrity. On Long Island Sound, in particular, focus on the sub-watersheds surrounding the bays and harbors of the Sound is needed.

Each of the counties in the Long Island Sound watershed has a committee formed in part with 319 funds and including a range of local opinion and expertise. These committees have in many instances developed priority lists for remediation of nonpoint pollution problems in their respective communities. For example, the "Westchester County Executive Citizens Committee on Nonpoint Source Pollution in Long Island Sound" has developed

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recommendations for biological controls including immediate and long-term action to abate nonpoint source pollution (July 1993).

Public Education Programs

Public education can help to reduce the severity of pollution problems by changing behavior and increasing support for additional pollution control measures. Existing and planned education programs in the Sound watershed address many of the most important aspects of pollution control, and should be continued. For some issues, such as the availability and efficacy of nitrogen reducing OSDS technology, increased effort is needed.

Examples of Nonpoint Source Pollution Control Approaches

The preceding analysis focused on particular types of land uses and activities which can result in adverse impacts on water quality for the Sound as a whole or for smaller components, such as embayments. The particular interplay of these numerous factors will vary from site to site within the Sound watershed. Following are two examples of particular bays with existing water quality problems, together with site-specific recommendations for improving water quality.

Oyster Bay Harbor

As noted in the previous section, shellfishing is precluded in the lower portion (762 acres, or 14% of the 5,040 acre area) of Oyster Bay Harbor and in Mill Neck Creek, primarily because of the presence of high coliform levels. A number of sources account for this, including a wastewater treatment plant, on-site sewage disposal systems, vessel wastes, waterfowl, and urban runoff. A volatile organics remediation program is needed to aid in the cleanup of the Jakobsen's Shipyard site. Oil spills have occurred at the Commander Oil facility. While the priority given to this harbor is high, the 1991 DEC Priority Water Problem List notes that "Technical/ Economic/Social Resources Do Not Allow Resolution." Such an assessment is not meant to imply that progress cannot be made; rather, it can serve as a notice that solution of the water quality problems in the area will require concerted action to deal with a number of pollutants and sources. Even if such factors preclude a complete cleanup of the harbor, there are many individual actions which could be taken which would, in sum, greatly improve harbor water quality. The recent improvements to the wastewater treatment plant demonstrate that progress can be made, even if direct water quality impacts are not immediately discernable.

Given the variety of sources of contaminants, it is clear that an effective management program will require implementation of a number of the recommendations discussed earlier. In the past, the Oyster Bay wastewater treatment facility was one of the major contributors to nitrogen and coliform loadings in Oyster Bay Harbor. A few years ago, the plant was hydraulically overloaded, with an average flow of 1.5 MGD (million gallons per day) and a design capacity of 1.2 MGD. Much of the problem could be traced to infiltration and inflow problems in the collection system. In addition, the Oyster Bay wastewater treatment facility, like others in the Sound watershed, is affected by the freeze on nitrogen loadings designed to reduce hypoxia in the Sound. These factors led to a moratorium on new sewer hookups.

That moratorium was lifted as of June 1993, after plant capacity was expanded to 1.8 MGD by reengineering existing facilities and adding additional capacity, including rotating biological chambers (RBCs) and tanks allowing for an extended chlorine contact time. It should be noted that the moratorium was enacted as a response to the overall capacity issue,

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not strictly because of nitrogen outputs. At this time, the plant does not have tertiary nitrogen removal capacity.

This situation represents a case in which there was some opposition to an upgrade because of fears that such an action would allow additional development. Clearly, if restrictions on future development are desired, there are other approaches which would accomplish that goal, while still allowing for reduction of pollution loadings into the harbor. From the perspective of environmental protection, the ideal solution is the combination of enactment and enforcement of regulations aimed at managing future development to minimize environmental impact with the reduction of pollution from existing sources.

Problems with on-site sewage disposal systems, largely cesspools and septic tanks, also need to be addressed. Like many examples of nonpoint pollution from urban sources, management might best be divided into two major components, new and existing systems.

Existing system management can be achieved through routine maintenance and prompt repair or replacement of failing systems. Because many homes located in areas served by sewer systems are not hooked up but instead continue using OSDS, such maintenance programs should not be limited to areas not in sewer districts. In practical terms, this implies several management strategies.

One viable approach is for municipalities to create a utility dealing with OSDS siting, installation, and maintenance. Such an approach seems likely to be useful in Oyster Bay, given the number of OSDS in the watershed. This approach can readily be adapted to incorporate both new and existing systems.

Polluted runoff from roads is a major issue in the Oyster Bay Harbor watershed. At Mill Pond, for example, although available documentation is poor, it appears that fish survival is threatened primarily by urban runoff, in particular, runoff from roads. The preceding general discussion provided some guidance or approaches to reduce pollution from new roadways, both during and after construction.

More important for the Oyster Bay watershed is pollution minimization from existing development. In many instances, runoff management structures can be added as retrofits when roads are resurfaced or otherwise improved. For areas with remnant pervious areas, such areas can be made subject to restoration requirements. This approach has the additional advantages of increasing protection for open space, and may in many instances improve habitat protection, groundwater recharge, and provide other benefits. Median strips, artificial wetlands, retention basins, and other road associated space can be engineered to improve pollution control potential.

Because most roads in the area are owned and maintained by a unit of government, application of these practices can be achieved without the requirement of regulatory authority. However, such a regulatory approach may be needed to deal with those roads which are privately owned.

Another aspect of urban nonpoint pollution of importance in the Oyster Bay system is the use of fertilizers and pesticides on lawns, gardens, and grounds, and the use of de-icing salts on parking lots and roadways adjacent to the harbor. Use of fertilizers at a level far exceeding that needed for optimal growth is common. For municipal property, such as parks, this problem can be addressed through greater care in management. Additionally, use of vegetation adapted to local conditions can drastically reduce the need for pesticides and

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fertilizers. A clear first step in this area is the reduction of fertilizer and pesticide use at the state facilities, and reductions in the amount of de-icing salts for roadways. In particular, rough areas of golf courses are excellent candidates for conversion to indigenous vegetation, with consequent reductions in management intensity needed. Resultant benefits include both environmental protection and reduced maintenance costs (see recommendations in the ecological complexes section of volume 1, LIS CMP).

Oil spills are to some extent inevitable at a working oil transshipment terminal. However, it is possible to reduce their environmental impact in two ways, by reducing the frequency and size of spills and by proper management of spills which do occur. This can be done through both structural and operational management. In some cases, economic and environmental considerations will imply a phasing out of certain facilities (see discussion in The Working Coast). For all operations, adequate spill containment and cleanup equipment should be available, and personnel should be trained in spill cleanup techniques.

Because of their location, marinas represent another category of pollution sources which should be addressed in any complete Oyster Bay management plan. While it is unlikely that there will be significant development of new or significantly expanded marinas, site design and proper facility maintenance can minimize adverse environmental impacts from these activities. More important for the Oyster Bay situation, management of the seven existing marinas (1 private and 2 public), yacht clubs (2), and boat yards (2) can reduce pollution of the bay.

It must be recognized that such pollution reduction will not automatically result in opening to shellfish harvesting areas which are currently closed. Public health standards require closure of shellfishing beds around marinas and mooring areas because of the potential for pollution from vessel wastes. However, as discussed in the previous section, improvements in water quality can be measured in several different ways. Reduction of oil and grease pollution, for example, will have direct aesthetic benefits as well as less tangible but important effects on a wide range of marine organisms.

The management of stormwater runoff, particularly from hull maintenance areas, is a major factor in reducing the environmental impacts of marinas on water bodies. Runoff from the hull maintenance areas and other locations which are likely to have significant levels of pollutants can be reduced in several ways. Contamination of runoff is minimized if maintenance activities take place under roofs, which channel stormwater away from the pollution. If the activities occur on an impervious surface, such as cement, routine maintenance, such as sweeping or vacuuming, will reduce pollutant loadings. Vacuum attachments to sanders used in hull preparation can further reduce pollutant loadings. Each of these measures can and should be required.

Further protection can be afforded by the use of pollution interception and treatment systems, such as sand filters, wet ponds, and infiltration basins or trenches. While these do not remove all pollutants generated on-site, they do reduce the levels of some major pollutants.

As is the case with oil terminals, it is to be expected that spills will occur at marina fueling stations. Proper siting of fueling stations can minimize the effect of spills. Further protection can be obtained by the development of a spill contingency plan, which should be practiced so that all personnel know how to implement it. Obviously, adequate spill containment equipment should be accessible.

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Table 14 Management Techniques for Oyster Bay and Stony Brook Harbor

SOURCE	OYSTER BAY	STONY BROOK
On-site disposal systems	a) municipality assumes responsibility for maintenance, b) refine regulations to minimize environmental impact	same
Overloaded WWTP	a) revise land use regulation to restrict future development, b) expand and upgrade existing system	not applicable
Road runoff	a) variety of option, including detention basins, b) preservation of remnant pervious areas, etc.	variety of options, especially detention basins
Home fertilizer use	a) education program, b) tax on fertilizers, portion of proceeds to go to education and remediation of other pollution problems, c) encourage use of native vegetation	same
Oil terminal	a) require adequate spill control program, including equipment and training, b) routinize procedures to minimize spills, 3) phase out operations as discussed in Working Coast section	not applicable
Marinas	a) reduce runoff from hull maintenance areas, b) reduce contamination through materials management program, c) treat runoff using sand filters, wet ponds, etc. d) limit number and locations of new marinas	same
Boat wastes	a) provide pumpout facilities at all public marinas, b) require private facilities to provide pumpouts individually or jointly, c) designate and enforce the embayment as no discharge zone	same
Waterfowl	a) develop and implement program to reduce population of exotics, minimize impacts of migratory waterfowl	same

Sewage wastes from boats can also be a significant problem. Given the limited circulation of waters within the Oyster Bay Harbor complex and the presence of significant shellfisheries, it is logical to prohibit dumping within the complex. Before such a prohibition could be workable, there must be adequate provision of pumpout facilities. This could be accomplished by municipal action at the two public marinas, but may require regulation for the five private facilities in the bay. Clearly, such facilities must also be maintained properly.

A variety of harmful materials are routinely used at marinas, including solvents, paints, antifreeze, and cleaning chemicals. Entry of these materials to surface waters can be minimized through such actions as provision of appropriate disposal facilities, the encouragement of recycling where possible, and the construction and maintenance of curbs or berms to reduce runoff from the areas in which the materials are used. The use of harmful chemicals, such as lye, can be discouraged through education programs when environmentally more benign alternatives are available.

While the preceding discussion should not be viewed as exhaustive, the basic problems of municipal wastewater treatment, urban runoff, inadequate on-site sewage disposal systems, and marina and vessel pollution management must be addressed if water quality in Oyster Bay is to be significantly improved. The preceding recommendations highlight some of the approaches which might be used to deal with these problems.

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Stony Brook Harbor

The DEC 1991 Priority Water Problem List notes that shellfishing is impaired in Stony Brook Harbor, largely due to coliform loadings. The primary source of pollution in the harbor is urban runoff, particularly from streets and parking lots. For Stony Brook Harbor, stormwater runoff, exotic waterfowl, and vessel wastes have been identified as the most important problems, with on-site sewage disposal systems a possible problem. Excessive use of lawn and garden fertilizers, herbicides, and pesticides, especially at the Nissequogue Golf Club, also contributes to pollution in the harbor.

The low density residential development within most of the harbor's narrow drainage basin presents the problems of inadequately designed, located, and maintained on-site sewage disposal systems. Several approaches for resolving this problem are discussed in the section focusing on Oyster Bay Harbor, including a proposal that the municipality assume responsibility for maintenance in return for an annual fee. Such a management strategy may also be appropriate for this water body.

The problem of street runoff is particularly important in Stony Brook Harbor, in large part because of the relatively steep slopes leading to the harbor. It is unlikely that future development will necessitate extensive construction of new roads, so the most important factor to consider in pollution control is reduction of runoff from existing impervious surfaces and reducing and preventing vessel waste discharges and malfunctioning septic systems. The installation of infiltration systems, detention basins, and artificial wetlands in filled areas would greatly reduce pollution of the harbor. Local regulations require new construction to limit runoff on-site to pre-development levels and minimize increases in total suspended solids (TSS) leaving the site. This can be done through such approaches as minimizing the extent of impervious surfaces and the use of on-site retention facilities. Ideal sites to demonstrate management practices to reduce and control runoff from streets and parking lots include Cordwood Path Beach at the south end of the harbor and the filled lands adjacent to the Long Beach Town Park parking areas on the north side of the harbor. Parking lots and open space park areas in the hamlet of Stony Brook might also prove excellent examples of the possibilities of retrofitting for pollution control.

One somewhat unusual problem encountered in Stony Brook Harbor is the nutrient and coliform loadings from waterfowl. Large-scale habitat changes have led to shifts in the migration patterns of many waterfowl. This has led to localized problems with large populations of waterfowl contributing significantly to nutrient and coliform loadings. The problem is exacerbated by the presence and growth of exotic populations (introduced or nonindigenous species), such as the mute swan.

While complete control of wild waterfowl is neither possible nor desirable, it is possible to reduce the adverse impacts of some species. Reduction of the mute swan and Pekin duck populations would likely have beneficial impacts on local water quality as well as improve habitat for native species, such as wood and black ducks. Such population reduction can be achieved in several ways. One approach is to coddle eggs. This technique reduces the reproductive efficiency of the population by destroying the viability of eggs while reducing the probability of second clutches, leading to an eventual population decline. In addition, it is possible to discourage large concentrations of such migratory waterfowl from remaining in an area permanently through fairly subtle habitat changes. For example, Canada geese prefer to maintain visual contact with water, and even a relatively narrow band of shrubs or other tall vegetation around a water body reduces its attractiveness to the geese without

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actively harming the waterfowl. The importance of the harbor as a natural area and the water quality implications both support such programs.

Marinas present another set of water quality issues. Restrictions on new marina development and expansion of existing marinas should not be construed to imply that existing marinas cannot alter their operations in ways which will improve water quality. As an example, the provision of pumpout facilities or dumping stations for wastes may be an expansion of the services offered by a marina, but is clearly beneficial. It may be appropriate to require all marinas to either provide or contribute jointly towards operation and maintenance of such facilities. Similarly, existing marinas may be required to retrofit or alter management approaches so that runoff from parking areas and potential contamination are minimized. The discussion of the Oyster Bay recommendations provides greater detail.

Table 14 summarizes the significant water quality problems in Oyster Bay and Stony Brook Harbor. As can be seen, many of the same problems are important in the two areas. In some cases, the same management techniques will be appropriate. In other cases, however, different techniques will be appropriate. Even within one basin, full resolution of a problem may require the use of several different approaches. For example, road runoff can be minimized by appropriate design, the use of infiltration basins, filter strips, and several other techniques. The most cost effective technique can only be determined on a site-by-site basis. It is therefore likely that Oyster Bay, for example, will use many different specific techniques in order to achieve its goal of reducing road runoff. Stony Brook might also use all of the same techniques, but because such site conditions as slope are somewhat different and the watershed is not extensively developed, the final mix might be very different from that found in Oyster Bay.

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Chapter 3

The PUBLIC COAST

Connect people to the Sound and its public resources by improving visual and physical access, and providing a diversity of recreational opportunities.

The public's right to gain physical and visual access to the recreational opportunities and beauty of New York's coastal resources has long been recognized. However, this right has not always been easily exercised, particularly in the Long Island Sound region. Here, there are few facilities open to everyone that offer major recreation opportunities. The general public is usually excluded from local access and recreational facilities because of residency restrictions. Furthermore, the nature of existing as well as continuing development makes the provision of additional coastal access and recreation facilities more difficult. Visual access to the waters and shores of the Sound is often blocked by development. The basic right to use and enjoy public trust lands is increasingly being thwarted by development that limits the public's ability to reach public trust lands. Often associated with development are structures, such as long docks which obstruct lateral access along public trust lands and impede public use of surrounding public waters.

The need to ease the limitations on the general public's ability to exercise its rights of physical and visual access to the Sound coast is reflected in the theme for the public coast: **Connect people to the Sound and its public resources by improving visual and physical access and providing a diversity of recreational opportunities.** As more fully explained in the following sections, there are a variety of ways by which this theme can be advanced. These include: acquisition of coastal land by the state and development for access and recreational purposes; taking advantage of opportunities on state owned lands for enhancing physical and visual access and recreation facilities; developing creative new partnerships with local government and land conservation groups; establishing travelways to and through public open spaces and public trust lands and waters; maintaining and creating visual access to the Sound and to significant land and water vistas that define the Sound's unique qualities; exaction of public access through the development approval process; and reasserting and guaranteeing the public's rights and interests in the waters and foreshore of the Sound and its natural and scenic resource base.

PUBLIC ACCESS, RECREATION, AND OPEN SPACE AREAS AND FACILITIES

Currently, both the public and private sector are involved in a variety of ways with public access and recreation in the Long Island Sound region. Local, state, and federal government agencies plus the private sector plan, acquire, develop, and manage waterfront public access, recreation, and open space facilities in the Sound region.

Local governments are responsible for planning, acquiring, developing, and managing most of the public access, recreation, and open space facilities along the Sound. At the state level, the Office of Parks, Recreation, and Historic Preservation (OPRHP) operates and manages state parks, while the Department of Environmental Conservation (DEC), manages

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conservation areas and fishing access sites in the Sound region. A third state agency, the Department of State (DOS), plays a lead role through the State Coastal Management Program, which provides for the development and implementation of state coastal policies dealing with access, recreation, and open space facilities. DOS, through its consistency review process, ensures that the coastal policies are adhered to by federal and state agencies. At the federal level, there are two wildlife refuges and a national historic site along the waterfront that are operated and managed by the U.S. Fish and Wildlife Service and the National Park Service, respectively. Funding for the acquisition and development of facilities comes from both federal and state sources. Management and maintenance funds come from state sources, such as the State Park Infrastructure Fund.

Privately owned waterfront areas along the Sound provide the general public with some access and passive recreation opportunities, or if the public is excluded, offer open space benefits. These latter areas are primarily golf courses, while the areas offering access and passive recreation are generally nature preserves owned by the Nature Conservancy or local conservation groups.

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) was used in the preparation of this component of the LIS CMP. To ensure that the state and its communities are well-served by public access and recreation facilities, OPRHP prepares a SCORP every five years. The most recent plan, completed in 1994, is entitled "People, Resources, Recreation." The plan serves as a status report and overall guideline for recreation resource preservation, planning, and development. It is the state's assessment and policy document for the executive and legislative branches of state government, other units of government, recreation and preservation interest groups, and the general public. SCORP is utilized as a basic information source, particularly for recreational issues, policies, priorities, and for supply and demand forecast data.

Another important document used in the development of the LIS CMP and its recommendations was "Conserving Open Space in New York," released in 1992 after being prepared through a mutual effort by DEC and OPRHP in conjunction with nine regional advisory committees appointed jointly by the state and county governments. The plan proposes what open space should be saved for the state's future, and describes how to conserve and manage that open land in a sensible and affordable way. It is thus a guide for the implementation of policies and programs to conserve open space by DEC, OPRHP, and other state agencies.

A third document prepared by DEC, entitled "Marine Recreational Fishing Access Plan," was also important in the preparation of the LIS CMP. The objectives of this plan, released in March 1993, were threefold: (1) to inventory existing marine recreational fishing access sites in the state's marine and coastal district; (2) to determine additional marine recreational fishing access needs and those benefits that accrue from expanded access; and (3) to develop a plan to satisfy the marine recreational fishing access needs identified in the study.

In the following discussion of the regions's public access, recreation, and open space resources, the types of access discussed are defined as: **general public access**—all members of the public regardless of residency or any other factor are allowed to use a facility; **restricted public access**—there are residency restrictions on one or more public uses of a facility (nonresidents may not be allowed to use a facility, may be allowed to use some but not all of the features of a facility, may be charged a higher fee than residents to use some or all of the features of a facility, or may be allowed to use facilities only at certain times

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of the week); and **private access**—access is allowed only to members of a private club or other group such as shore and beach clubs, golf clubs, yacht clubs, neighborhood beach associations, etc.

The Westchester County Shore

Approximately seven miles of the county's 36 miles of shoreline are in public ownership, with most of this being parks and open spaces providing general or restricted public access to the water and various kinds of active and passive recreation. The areas and facilities are either municipal or county operated; there are no state parks. Shoreline areas in private ownership as private recreational facilities provide water-dependent recreation for members only, but in a few cases, such as the Larchmont Manor Park, access and recreation opportunities are available to the general public.

Map 12.0 shows the locations of public and private waterfront access and recreation areas along the Westchester County Sound shoreline. Three categories of areas are shown: (1) general public access areas, (2) restricted public access areas, and (3) private access areas and facilities. Also shown on the map are some street end access points and beach closure areas. Appendix 4 contains specific information on various facilities for all communities in the Long Island Sound coastal area.

One major waterfront recreation park, Playland Park, operated by the county, and two smaller municipal parks along the shore, Harbor Island Park in the Village of Mamaroneck, and New Rochelle's Five Island Park, are open to the general public without any restrictions. Other municipal parks with beaches and swimming pools restrict use to residents, although most communities allow nonresidents to use other areas of parks for passive recreation. Two of the four boat launch sites are restricted to county or local residents. Limited or no parking in the vicinity of the few street end access points generally restricts use of these areas to nearby residents. Conservation/open space areas, such as the Marshlands Conservancy, are usually open to anyone.

The Bronx and Queens Shore of New York City

A high percentage of the shoreline in this area is publicly owned. Most of this public shoreline consists of parks and open spaces providing general public access to the water and various kinds of active and passive recreation activities. There are no residency restrictions on use of the city's parks and natural areas in the area, although certain activities have an admission fee.

Map 12.1 shows the locations of three categories of public and private waterfront access and recreation areas, as described for Westchester County above, along the New York City Sound shoreline. Appendix 4 summarizes the types of public waterfront access and recreation sites and facilities. Not listed, but shown on the inventory map, are numerous street ends which are important for providing point access to the shore.

Pelham Bay Park, the city's largest park with 2,764 acres and 13 miles of shoreline, is in the northeast corner of the Bronx and contains Orchard Beach, one of the city's major swimming beaches. In addition to swimming, this park offers a variety of other active and passive recreational activities. Alley Pond Park, located at the southern end of Little Neck Bay on the Queens north shore, is the other major park in the region with public access to the waterfront. The park offers both active and passive recreation in its 654 acres of forests, ponds, salt marshes, and Alley Creek. The third major park is Udalls Cove and Ravine at

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the northeastern corner of Queens. Its 52 acres are managed as a nature preserve, but provide a variety of passive recreation activities. In addition to four other parks in the region, there are numerous street ends, a bicycle and pedestrian path, and a public promenade.

In the East Bronx, there are some shoreline areas owned by private clubs that provide water-dependent recreation for members only. A large, impressively sited parcel of public land in Queens, Fort Totten's 147 acres, remains under military jurisdiction with no general public access.

On City Island, there are many street ends which are technically public; however, they have been illegally taken over by block associations and improved with beaches, benches, and other street furniture. The associations maintain the areas and generally permit use by members only.

THE NASSAU COUNTY SHORE

The largely residential coastline of Nassau County is interspersed with public parks and open spaces, providing both general and restricted public access to the water and various kinds of active and passive recreation. Approximately 12.5 miles of the county's 73 miles of Long Island Sound shoreline are publicly owned. The facilities are either federally, municipally or county operated. There are no state parks along the county's waterfront. The federal government has two facilities: the Sagamore Hill National Historic Site and the Oyster Bay National Wildlife Refuge.

Map 12.2 shows the locations of three categories of public and private waterfront access and recreation areas along the Nassau County Sound shoreline. Appendix 4 lists and describes the types of public and private waterfront and recreation sites and facilities. The sites are keyed to the waterfront access and inventory map. Not listed, but shown on the inventory map, are street ends which are locally significant for providing waterfront access to public trust lands.

While there are some local parks that have no residency restrictions, invariably these are parks offering only passive recreational activities such as hiking, picnicking, nature study, etc. Parks with active recreational facilities such as beaches and swimming pools are usually restricted for use by residents only. Only three out of twenty fishing access sites along Nassau County's north shore have no residency restrictions.

Shoreline areas in private ownership include beach clubs or associations, which provide water-dependent recreation for members only, and nature preserves, such as those owned by the Nature Conservancy, which provide access to anyone if prior permission is obtained.

THE SUFFOLK COUNTY SHORE

For ease of discussion, the Suffolk County shoreline is divided into two sub-areas. The western sub-area extends from the Nassau County border to include the Village of Port Jefferson. The eastern sub-area continues from the eastern boundary of Port Jefferson to Fishers Island.

The **western Suffolk County** area is predominantly residential, but there are numerous parks and open spaces providing general and restricted public access to the waterfront, as well as both active and passive recreational facilities. In addition to the preponderance of areas and facilities that are municipally owned, particularly resident-only beaches, the county, state,

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and federal government also own property. The federal government has one facility, Target Rock National Wildlife Refuge, while the state operates three state parks. Only one state park, Sunken Meadow State Park, is highly developed. It is the largest beach facility on Long Island Sound in both Nassau and Suffolk counties and draws the highest number of visitors per year to the Sound of any facility. Of the other two state parks, Caumsett State Park is not developed for active recreational uses, but offers several passive recreational activities, as does Caleb Smith State Park, which is primarily a natural area.

Maps 12.3 and 12.4 show the locations of three categories of public and private waterfront access and recreation areas along the western Suffolk County shoreline. Appendix 4 lists and describes the types of public and private sites and facilities along the sub-region's waterfront. Not listed, but shown on the inventory map, are street ends which are locally significant for providing waterfront access to public trust lands. However, most of these street ends have residency restrictions.

As in other parts of the Sound region, there are some local parks that have no residency restrictions. Invariably these parks offer only passive recreational activities such as hiking, picnicking, and nature study. Parks with active recreational facilities, such as beaches and swimming pools, are usually restricted for use by residents only. Of the 23 municipal or county-owned fishing access sites in the sub-region, ten are open to nonresidents.

Shoreline areas in private ownership include beach clubs or associations, which provide water-dependent recreation for members only, and nature preserves, such as those owned by the Nature Conservancy, which provide access to anyone if prior permission is obtained.

The **eastern Suffolk County** area gradually becomes less residential from west to east, with vacant or agricultural lands becoming more predominant along the waterfront. Municipalities and the county operate a number of waterfront parks and beaches. There is only one major state facility, Wildwood State Park, although there are several DEC conservation areas that provide limited general public access for passive recreation purposes. There are no federal government facilities in this sub-region.

Maps 12.5 and 12.6 show the locations of three categories of public and private waterfront access and recreation areas along the eastern Suffolk County shoreline. Appendix 4 lists and describes the types of public and private sites and facilities along the sub-area's waterfront.

Many of the municipal and county facilities are closed to nonresidents, although seven of these facilities do allow nonresident use with payment of higher fees than are charged residents. Of the 15 municipal or county-owned (one is owned by DEC) fishing access sites in the sub-area, only five are open to nonresidents.

There are 24 private beach clubs and property owner associations in this sub-area, which provide water-dependent recreation for members only. There are also two privately owned nature preserves which provide access to anyone if prior permission is obtained.

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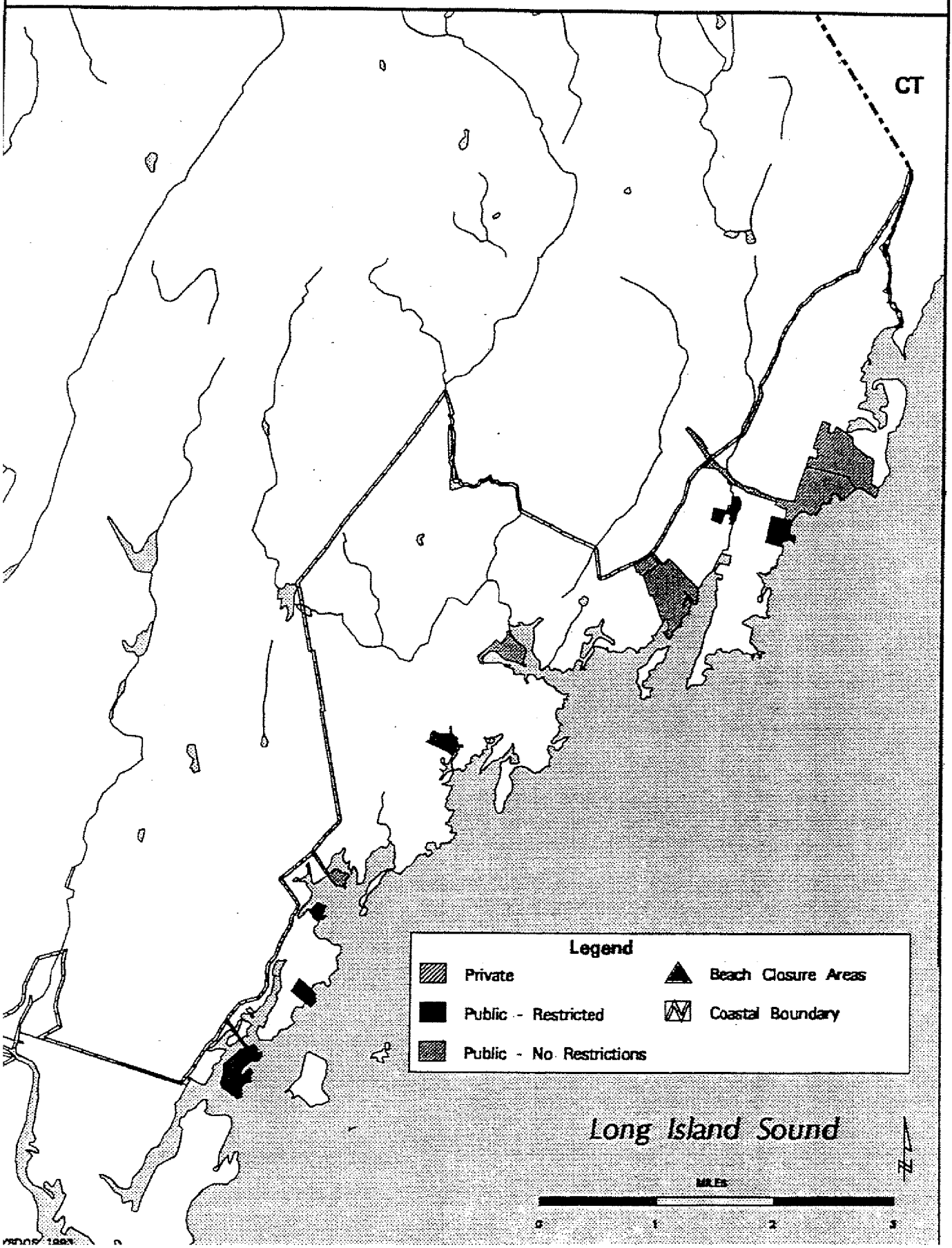
Westchester County
Existing Waterfront Recreational Access

MAP 10.0



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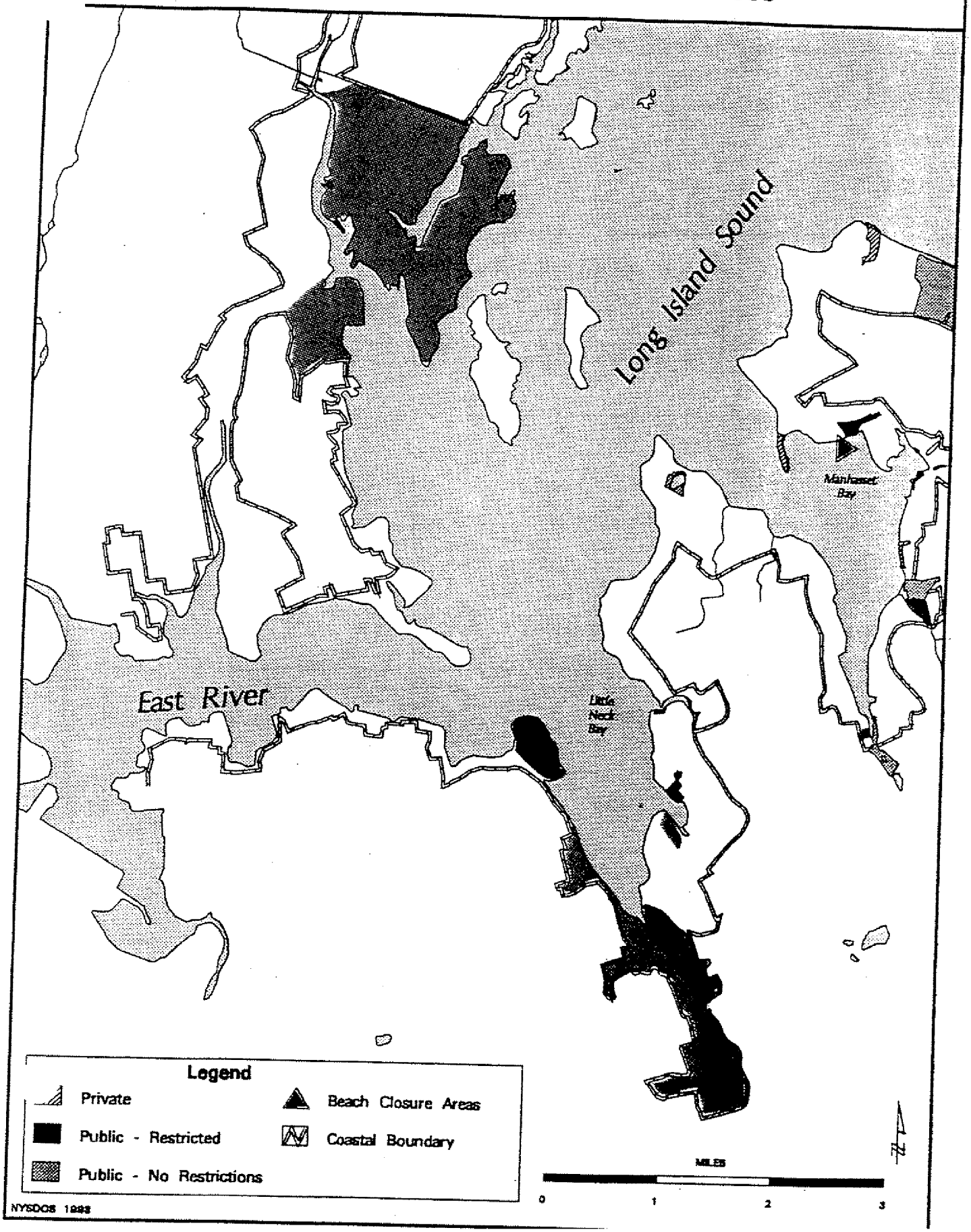
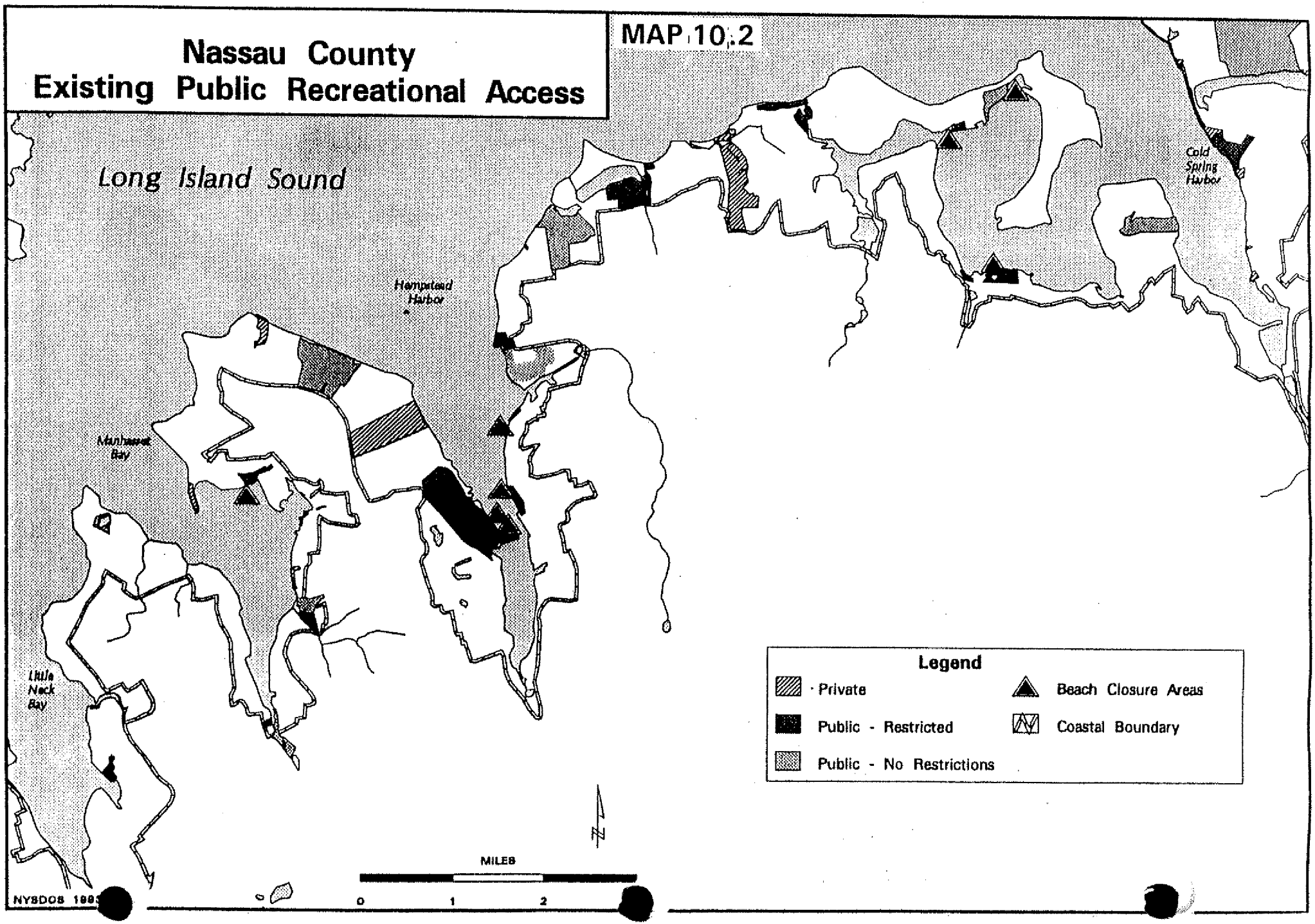
New York City
Existing Waterfront Recreational Access

MAP 10.1




Nassau County
Existing Public Recreational Access
MAP 10.2
Long Island Sound
Hempstead Harbor
Manhasset Bay
Little Neck Bay
Cold Spring Harbor
Legend
Private
Public - Restricted
Public - No Restrictions
Beach Closure Areas
Coastal Boundary
MILES
0
1
2
NYSDOS 199

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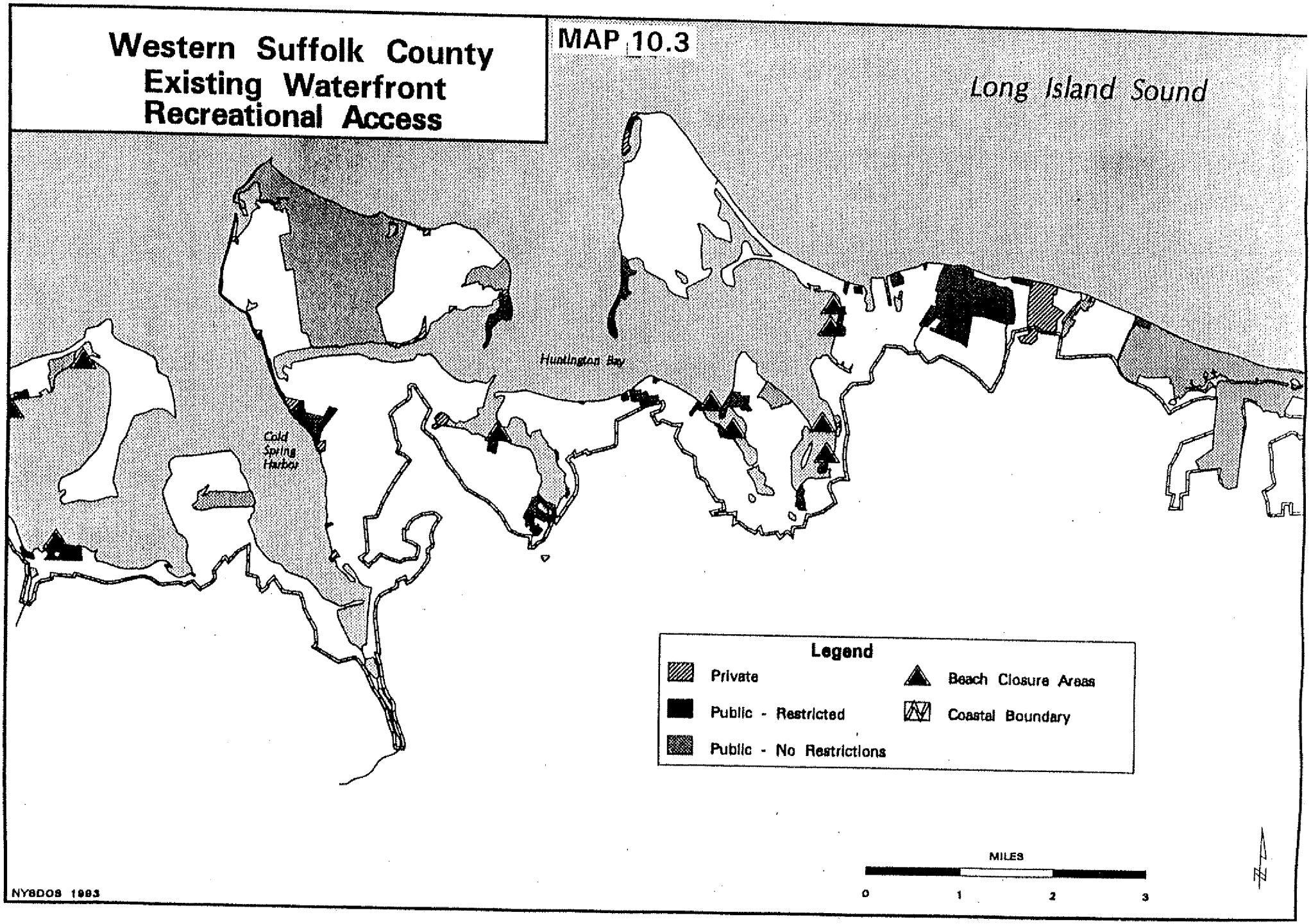
Western Suffolk County
Existing Waterfront
Recreational Access
MAP 10.3
Long Island Sound
Huntington Bay
Cold Spring Harbor
Legend
Private
Public - Restricted
Public - No Restrictions
Beach Closure Areas
Coastal Boundary
MILES
0
1
2
3
NYSDOS 1993

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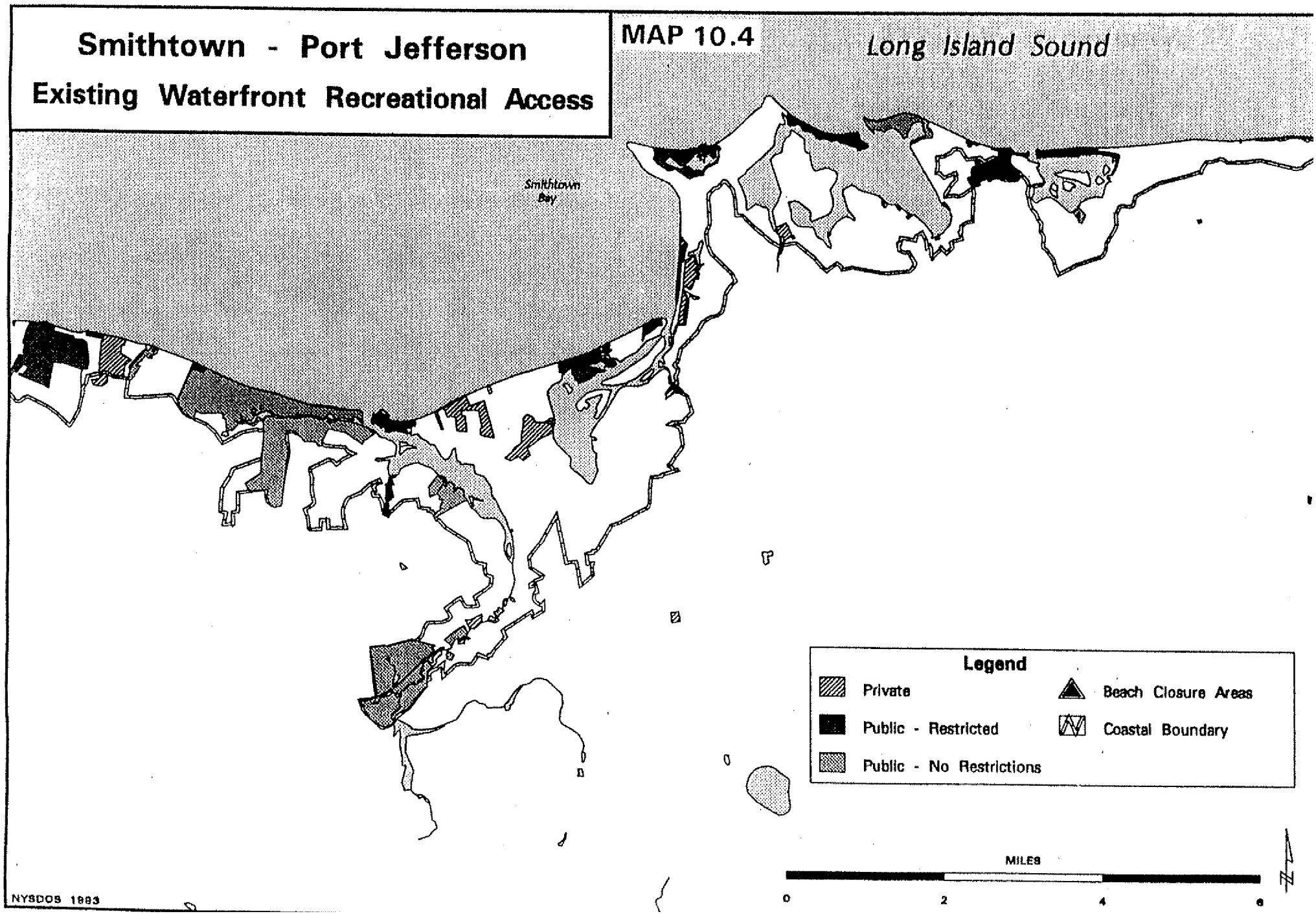
Smithtown - Port Jefferson
Existing Waterfront Recreational Access
MAP 10.4
Long Island Sound
Smithtown Bay
Legend
Private
Public - Restricted
Public - No Restrictions
Beach Closure Areas
Coastal Boundary
MILES
0
2
4
6
NYSDOS 1983

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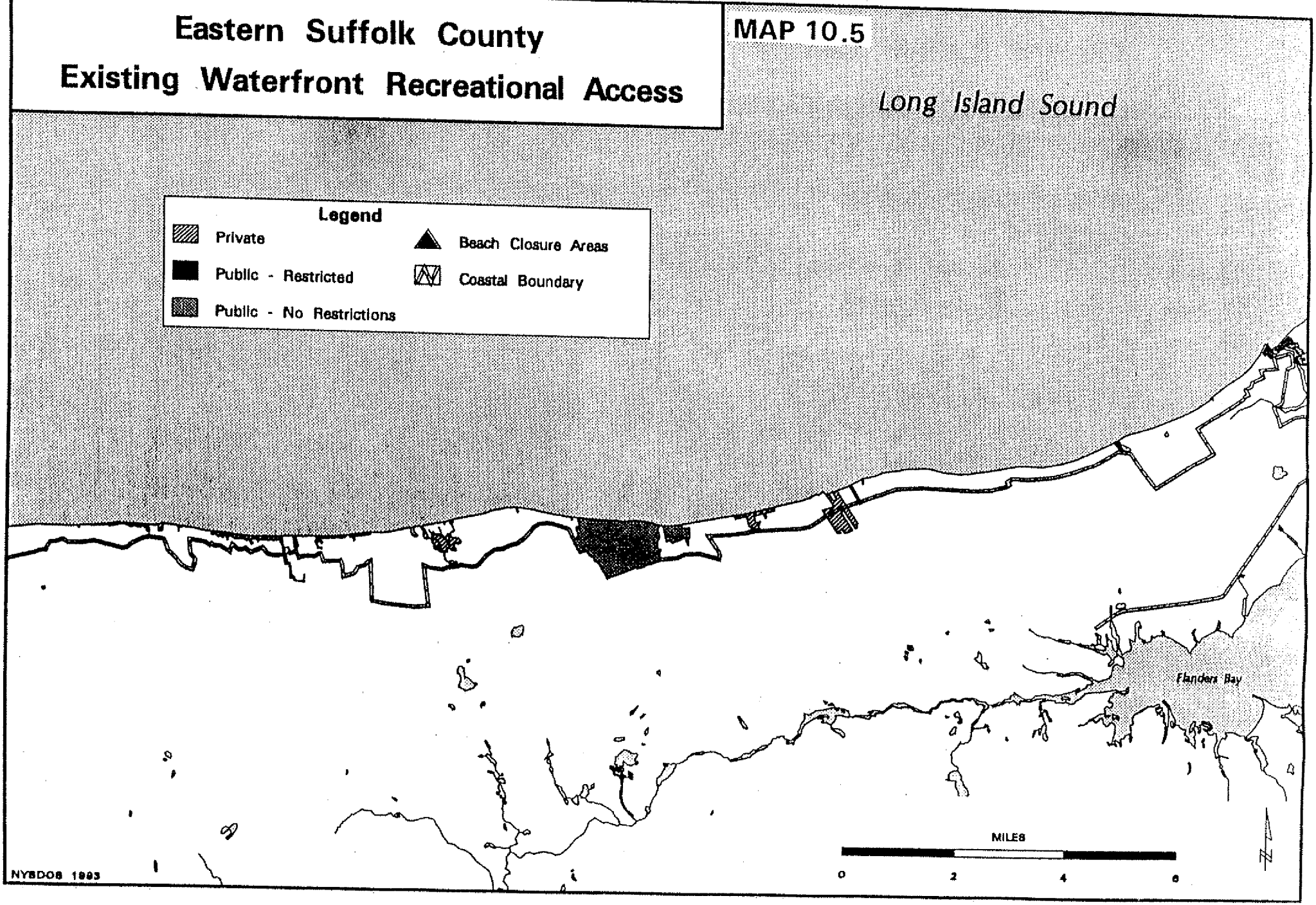
Eastern Suffolk County
Existing Waterfront Recreational Access



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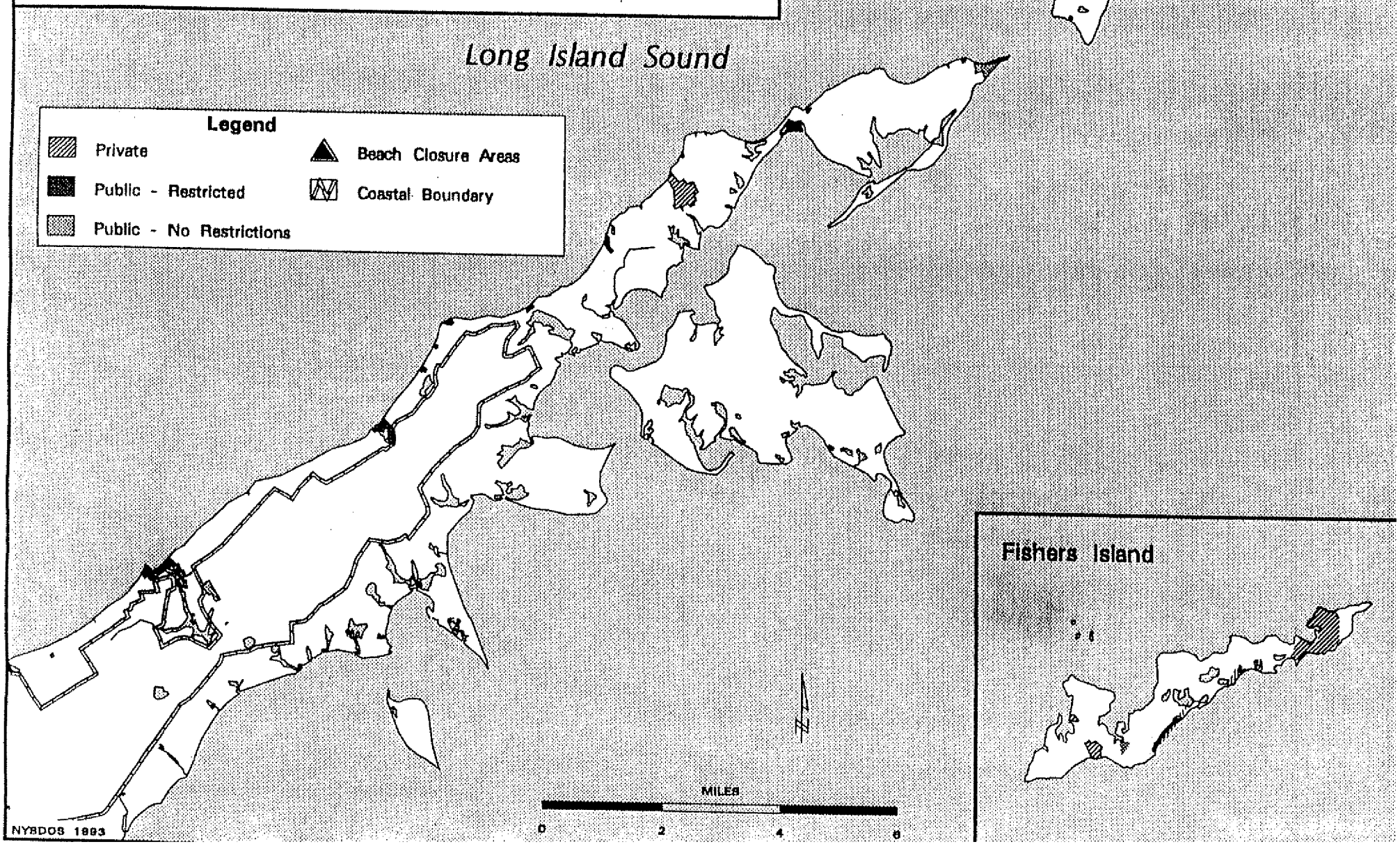
Eastern Suffolk County
Existing Waterfront Recreational Access

MAP 10.6



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Trends Affecting Public Access, Recreation, and Open Space Areas and Facilities

The current supply and existing use of the region's waterfront public access, recreation, and open space facilities, as well as future levels of demand, are examined in the following sections, which also bring together and incorporate various elements of recent state agency and local government plans for the future use and improvement of such facilities and the development of new facilities. It is especially important at this time, in a period of economic slowdown and a pause in the region's development, to make sure that there is consensus on what type of facilities are needed and where they are needed to satisfy the region's future public access, recreation, and open space needs.

Overview

Historically, the general public has been excluded from the use of the majority of public access, recreation, and open space facilities on the Long Island Sound coastline, particularly those facilities offering active recreation, such as beach swimming, fishing, boat launching, and non-water-dependent court and field games. As shown on map 13.0, there are only five major waterfront parks around the Sound that offer active recreation and are open to the general public.

Among Sound municipalities, only New York City's facilities are open to residents and nonresidents alike, without any differences in use restrictions for these two classes of users. Over the years, other Sound counties and communities have developed numerous public access and recreation facilities, but mostly for residents only. The result is that the general public is either excluded or discouraged from using more than half of the public access and recreation facilities and open space areas on the Sound and most of those offering active water-dependent recreation. If they are not specifically excluded, they are often discouraged from using these facilities by parking regulations that prohibit nonresidents or by lack of public transportation to facilities.

Local parks which received partial federal and state funds for their development or improvement are required to be open to the general public, such as Five Islands Park in New Rochelle and Harbor Island Park in the Village of Mamaroneck. However, many municipalities forego such federal and state funds to avoid having to admit nonresidents. Several of DEC and locally operated fishing access sites are also open to the general public, sometimes for a fee. According to DEC's "Marine Recreational Fishing Access Plan," 28 out of 75 public fishing access sites in the Sound region are open to the general public. Coastal nature preserves, such as Westchester County's Marshlands Conservancy, are usually open to the general public. Map 14.0 shows the locations of such preserves and parks around the Sound that are open to the general public for passive recreation.

Visual access to the Sound is also limited for the general public. Much of the shoreline is residentially developed, with some commercial uses in and near community centers. Although eastern Suffolk County is less developed than the rest of the Sound shoreline, visual access continues to decrease in that area because of residential development. While the Sound may be occasionally viewed from some streets and highways, residential and commercial development usually blocks views of the Sound. The only locations where the general public may obtain more than fleeting glances of the Sound are from those public access, recreation, and open space facilities open to everyone. As a result, for most people, the ability to obtain visual access to the Sound is dependent on gaining physical access at the relatively few facilities without residency restrictions. Even at street ends, the general public

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is often discouraged from viewing the water due to restrictions which prohibit or severely limit nonresident parking.

On the other hand, it is important to realize that Westchester, Nassau, and Suffolk counties and many municipalities each have large populations who are eligible to use the many facilities within their own jurisdictions and who may not feel deprived because they cannot use facilities in an adjoining community or county. Moreover, Long Island's north and south shores cannot be viewed as discrete areas for public access, recreation, and open space purposes. For example, the lack of many swimming facilities for the general public on the Sound is not necessarily a serious issue, for these facilities are complemented by numerous federal and state parks a few miles away on the south shore, which have long been open to everyone and provide a type of ocean beach and swimming experience not duplicated on the Sound.

In some Sound communities, the provision of public access facilities may be of little interest to residents. Because of their attractive shorefront environments, these communities became enclaves for the affluent, who formed numerous private clubs along the shore, offering access and recreation opportunities, but to members only and at a steep price. Also in these communities, another type of private club offering recreation for members only consisted of the many golf and country clubs established over the years. This has resulted in the existence of several thousand acres of open space in coastal areas, which have become valued for aesthetic and environmental reasons as they have become surrounded by development.

Supply of Areas and Facilities

In recent years, there has been no significant increase in the amount of public access, recreation, and open space facilities along the Sound open to the general public. For example, the number of state parks and preserves has remained at four for many years, although within the parks themselves there have been improvements, which have increased capacities and made the parks more attractive to users.

Incremental increases in the quality and quantity of general and restricted public access and recreation opportunities have occurred along the Sound over the years, as communities and counties have developed some new facilities and made improvements to existing ones. An example is a major new facility, Five Islands Park, which has been acquired and developed by New Rochelle as a park and nature preserve offering many types of passive recreation without residency restrictions. Another example is expansion of the existing boat launch ramp on the Nissequogue River at the Kings Park Psychiatric Center for general public use, now the subject of a tentative agreement to provide for this outcome. A final example is Port Jefferson, where obsolete or non-water-dependent industrial uses that formerly occupied strategic locations along the waterfront have been replaced with commercial and recreational uses that provide greater public access.

With the exception of New York City, where facilities are open to all, the established pattern of a few facilities open to the general public, and numerous other local facilities open to residents only, remains in place. The only exception is the relatively high number of public fishing access sites open to the general public, 28 out of 75; however, this varies by county. In Nassau County, only 3 out of 21 sites have unrestricted access, while in Suffolk County 15 of 38 sites are open to the general public. In New York City, all such sites are unrestricted, while in Westchester County almost half are.

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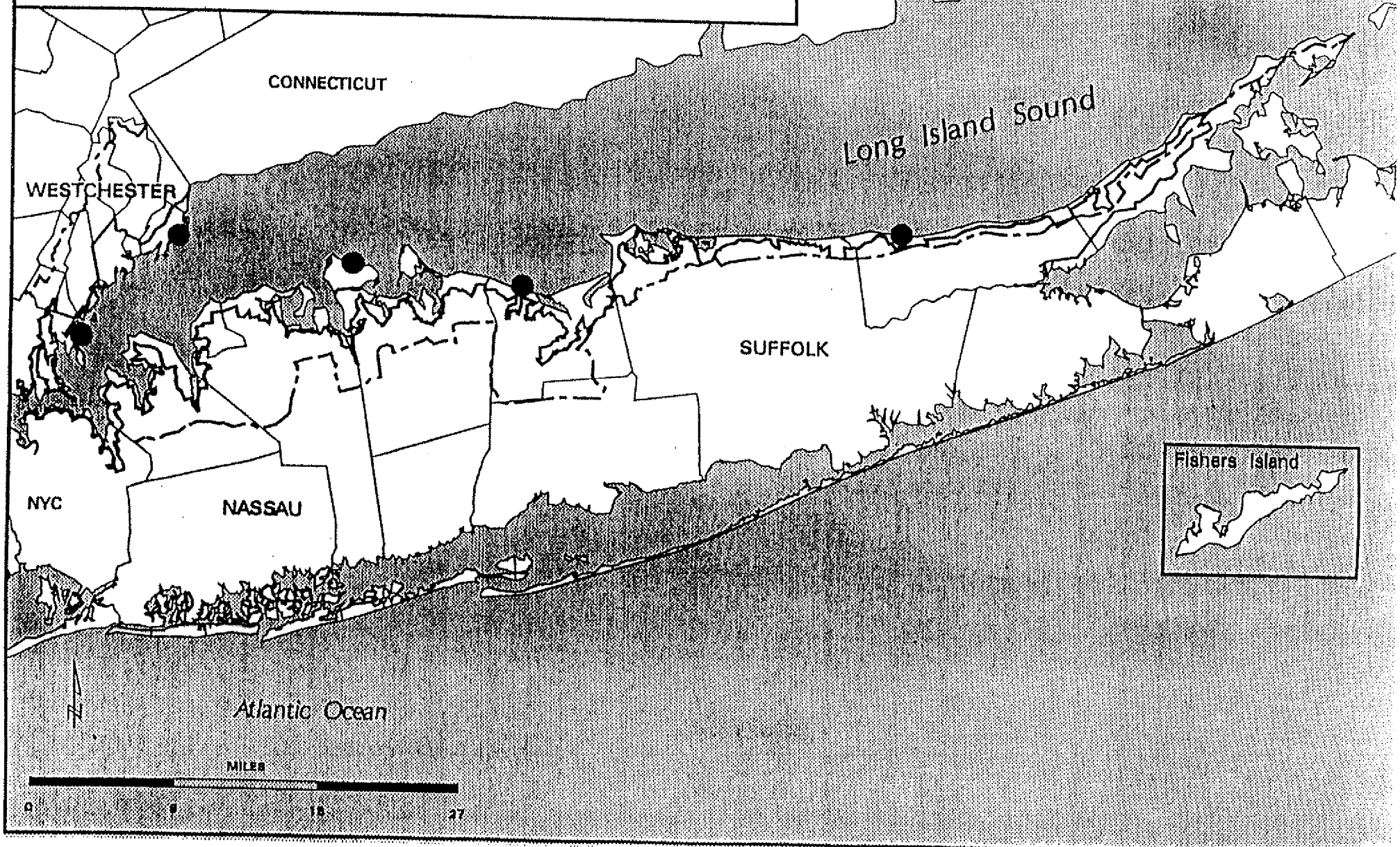
Major Waterfront Parks With Active Recreation and Open to the General Public

NYSDOS 1993

MAP 11.0



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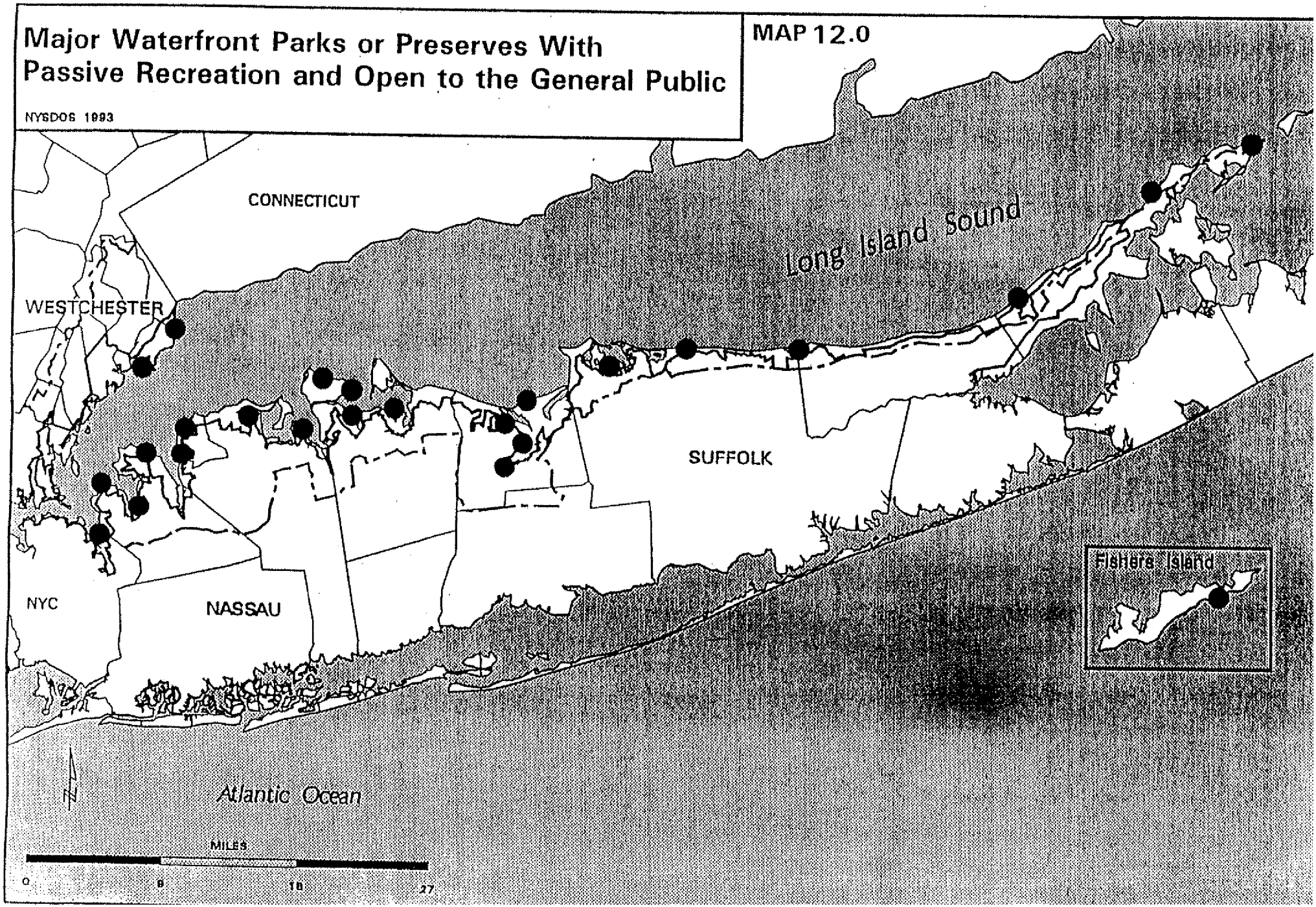
Major Waterfront Parks or Preserves With
Passive Recreation and Open to the General Public
NYSDOS 1993
MAP 12.0
CONNECTICUT
WESTCHESTER
Long Island Sound
SUFFOLK
NYC
NASSAU
Fishers Island
Atlantic Ocean
MILES
0
9
18
27

BW038114

SCORP characterizes public perceptions of deficiencies in the supply of public access, recreation, and open space in the Sound area by noting in its 1991 statewide survey, that 61 percent of the general public in the southern zone of the state, which includes the Sound region, "strongly agreed" with the statement that "government should purchase additional public access to water resources such as lakes, streams, beaches and ocean fronts." This compares with a 57 percent figure for the general public on a statewide basis.

Visual access to the Sound's coastal lands and waters is closely linked to physical access opportunities. With relatively few access facilities open to the general public, and with continuing shoreline development increasingly blocking visual access sites and corridors, the general public's ability to enjoy the visual qualities of the Sound's coastal areas is very restricted. Frequently, only glimpses of the Sound can be seen from nearby streets; a chance to enjoy the view is usually not possible because parking is often not allowed on these streets, there are no pulloffs for temporary parking, and any nearby local parks are usually closed to nonresidents.

Given the character of a highly developed shoreline in Westchester County, New York City, Nassau County, and western Suffolk County, there are relatively few opportunities for significantly increasing the amount and type of public access, recreation, and open space facilities along the Sound shoreline for the general public, short of opening local facilities to nonresidents. Moreover, many of these local facilities are designed to serve only a local population and may not be able to accommodate increased use by a larger segment of the public.

There are some opportunities for increasing the amount of general public physical and visual access and recreation facilities. Davids Island provides opportunities for open space to be used for public access and recreation purposes. Second, Caumsett State Park in Suffolk County, near the Nassau County border, remains a passive recreational park with potential for providing more access for the general public that is compatible with the park's natural environment. Similarly, Sunken Meadow State Park has potential for more water access. Third, there are opportunities for using public non-park waterfront lands for public access and recreation, such as sewage treatment plants (already done in New York City) or military facilities, such as Fort Totten in Queens. Fourth, the large number and acreage of private yacht and shore and beach clubs along the more developed areas of the Sound may provide future opportunities for public use if they should cease operating, as some already have. However, due to the high cost of such waterfront land, this may not be a viable option for many communities. Fifth, and perhaps least likely, there is the possibility of the state negotiating with counties or municipalities to allow nonresident use of appropriate larger facilities in return for state funds or other incentives.

Use of Areas and Facilities

The 1988 SCORP referred to the southern zone of the state, which includes the Long Island Sound region, as having a " . . . recreation supply [that] is periodically impacted by particularly overcrowded conditions" (page 2.22). The 1994 SCORP, in noting the results of the 1991 General Public Survey, found the southern zone of the state to contain the highest percentage of respondents (36 percent) of any zone strongly agreeing with the statement that "Most public recreational facilities in my area are too crowded" (page 2.16). SCORP also reported that a 1993 survey of park professionals found that 32.1 percent of these persons in the southern zone agreed with this same statement, far higher than the 22.3 percent figure statewide (page 2.18). DEC's "Marine Recreational Fishing Access Plan" states, with

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respect to unrestricted boat launch ramps, that there is overcrowding at these facilities throughout the entire Marine and Coastal District.

While there is heavy use of existing facilities in Westchester County, most county and local officials indicated that most facilities are not being overused to the detriment of the resource, with some exceptions. One exception is the Village of Mamaroneck's Harbor Island Park on the waterfront which was said by a local official to be overused to the detriment of the physical condition of the park.

At some facilities, the capacity of parking lots limits overuse. For example, Westchester County noted that Glen Island Park is heavily used on summer weekends when the weather is good, to the extent that traffic backs up outside the park, waiting until parking spaces are available. Similarly, a relatively small parking lot at the Marshlands Conservancy serves to limit attendance, which is desirable according to the curator, due to the fragility of the natural resources being protected. In other areas, municipal residency restrictions tend to limit overuse.

According to county officials, the beaches at the two Westchester County facilities are utilized to capacity on weekends, but underutilized on weekdays, like many recreational facilities of this type. Overall, county and local officials did not indicate that underutilization of public access, recreation, and open space areas is a serious problem.

Other factors have also affected the use of public access, recreation, and open space facilities in recent years. Lack of maintenance of facilities has reduced the quality of the access and recreation experience and in some cases has served to eliminate access. For example, lack of maintenance of Playland Pier at Playland Park in Westchester County resulted in its deterioration and recent partial destruction due to storms, with a corresponding elimination of the opportunity to use it for fishing and viewing the water. The pier is proposed to be rehabilitated.

Poor water quality has directly affected the use of recreational resources by causing closures of beaches for swimming and prohibitions on fishing. During the four summers from 1987 through 1990, there were 35 separate closures of Westchester County beaches on the Sound. During 1989 alone, Mamaroneck area beaches were closed for about 20 percent of the entire swimming season. In Nassau and Suffolk counties, 15 out of 90 bathing beaches were closed for one or more days during 1991 or 1992. In New York City, episodes of degraded water quality in Long Island Sound continue to disrupt recreational activities periodically, particularly swimming at Orchard Beach in Pelham Bay Park. Water quality here is among the best in the city, but the beach is closed at times due to high coliform counts and medical wastes.

Beach closures result from water pollution, in part, because of excessive rainfall causing stormwater runoff that forces sewage treatment plants to divert untreated sewage directly into the Sound. Another contributing factor to water pollution is direct stormwater and sheet runoff into surface waters (nonpoint source runoff), which contains pathogens picked up from impervious surfaces and the land. Much of the increased stormwater runoff is a consequence of the great deal of residential and commercial development that occurred in watersheds both inside and outside of the coastal area after World War II. Another adverse result of greater runoff has been the increased siltation of streams and harbors, which limits access to some of the harbor waters for boaters, unless dredging is regularly undertaken.

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Several severe storms in the past few years have caused significant erosion of beaches and bluffs and damage to facilities at waterfront parks and access areas. Sometimes this has occurred because of inappropriate erosion control structures. Lack of funds to repair damages quickly has reduced the quantity and quality of the access and recreation experience at these facilities

Until the recent recession, long waiting lists at public and private marinas were undoubtedly responsible for the increased use of boat launch sites by trailered boats that might otherwise be docked at marinas. Now, with the recession in the region still in evidence, waiting lists remain only at the lower-priced public marinas; nevertheless, demand for boat launch sites remains high, because boat owners who might otherwise have used private marinas are keeping their boats on trailers and using the boat launch sites in an effort to save money. With no waiting lists at private marinas, there are fewer being built, a positive development from an environmental standpoint, because of the lessened environmental impacts of the construction and operation of a boat launch site, as opposed to a marina.

Finally, persons with a variety of disabilities have become increasingly vocal about their legitimate right and ability to use public facilities on an equal basis with other persons. This has affected the manner in which public access and recreational facilities are made available, so that all persons, regardless of disabilities, are able to make use of and enjoy such facilities.

Future Levels of Demand

Neither the state, the counties, nor the municipalities have made quantitative projections of future demand for recreation along the Sound or for specific sites. Nevertheless, an analysis of general population trends, along with information from other sources, provides some insights into the future demand for public access, recreation, and open space facilities, in general, as well as the demand for specific types of facilities.

In recent years, there has been no significant population growth in the Long Island Sound region. In Westchester County, the population of most coastal communities, as reflected by 1990 figures, continues a slow decline. Also slowly declining are populations in the community districts in the Bronx and Queens adjacent to the Sound. On Long Island, the population is remaining relatively constant, slightly declining in Nassau County and slightly rising in Suffolk County. In common with much of the nation, populations in the region are generally aging, with declining family size and more households with fewer people in them.

A relatively stable population might suggest that there will be no increase in overall demand for public access, recreation, and open space facilities. The 1988 SCORP noted, however, that attendance at state parks on Long Island had been consistently rising over the years from 14,923,000 in 1977-78 to 20,760,000 in 1987-88. While the 1994 SCORP does not provide figures for state park attendance on Long Island since 1988, it does note that on a statewide basis, annual attendance at state parks and historic sites has continued to grow since 1988. This growth in attendance indicates that factors other than population growth are also important in determining the overall demand for public access, recreation, and open space facilities. Furthermore, changes in lifestyles, the economy, and population age groups could cause changes over time in the popularity of different types of public access and recreation activities.

According to SCORP's analysis of the 1991 Recreation Survey, most of the nineteen recreational activities surveyed, which included several water-related or -enhanced activities,

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are projected to increase on a statewide basis from 1990 to 2010 at a rate slightly above the overall population growth, estimated at approximately 6 percent for this time period. However, when the projections of the demand for recreational activities in the year 2010 are compared to today's recreational facility availability, SCORP's analysis indicates that the Long Island Sound counties will continue to experience heavy use of and demand for recreation facilities.

The changing population numbers in different age groups, a circumstance noted throughout the Long Island Sound region, causes changes in the types of activities called for in public access, recreation, and open space facilities. SCORP notes that "during the next twenty years a number of demographic changes within New York State will affect levels of participation in various activities. The most obvious statewide change in the demographic mix of the population will be the continuing increase in average age. As a result, although all the activities studied are growing at a rate close to the expected increase in population, larger changes will occur in activities which are age sensitive, such as golfing and fishing." The fact that current and future levels of activity can be predicted by looking at current and projected age structures has implications for the types of facilities and activities provided in public access and recreation areas.

The aging population in the region may bring demands for changes in the types of recreation and facilities provided in waterfront parks. As a current example, the increased number of walkers using such facilities as Glen Island Park in Westchester County in all seasons reflects the healthful aspirations of an increasingly older population in the county's coastal area. Such year-round park use has led the park to keep restroom facilities open all year. Similarly, there may be greater use of waterfront parks for such activities as bird watching, photography, painting and sketching, or nature study by an aging population. An increasingly elderly population may require that more facilities make appropriate accommodations in the activities they offer for the higher percentage of physically impaired persons among the elderly.

An aging population also will be increasingly less able to use private transportation to reach public access, recreation, and open space facilities. To continue to meet the needs of this population, public transportation routes will have to reflect the desire of the elderly to continue to make use of coastal public access and recreation facilities. Also, because of the higher percentage of physical impairments among the elderly, facilities may be required to make appropriate changes in the activities they offer to accommodate the needs of this group. Moreover, it is likely that all persons with physical disabilities will continue to demand that recreation and access facilities in waterfront parks be made more readily available for their use.

As environmental awareness continues to increase among all age groups, the use of waterfront parks and protected conservation areas for environmentally related activities will probably expand. SCORP projects a continued strong demand for hiking, including day hiking and nature walking, in the Long Island Sound counties from 1990 to 2010. To accommodate this demand, the development of greenways as linkages among the numerous parks and open spaces near and along the Sound can provide many opportunities for walking as well as for the inclusion of bikeways. A group on Long Island, the non-profit Long Island Greenbelt Trail Conference, establishes and maintains many miles of hiking trails in and between parks and open spaces on the island. Substantial portions of their trails are within the coastal area.

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More specifically, DEC's final "Marine Recreational Fishing Access Plan," projects a strong demand for future additional marine shorefishing access sites. Based on projected demands, DEC's plan includes recommendations for boat launch ramps, fishing piers, and beach access to promote marine recreational fishing in Nassau and Suffolk counties. The plan's findings coincide with the observations of Westchester County and local officials, based on their experience with various public access and recreation facilities, and with the conclusions of the New York City Comprehensive Waterfront Plan.

DEC's "Marine Recreational Fishing Access Plan" based its assessment of projected demand for recreational fishing facilities on the following factors: (1) a review of boating and fishing standards developed by other coastal states (New York has no standards for marine recreational boating and fishing); (2) state and regional population figures; (3) the current estimated number of marine recreational fishermen in the state; (4) the number of registered boats in the Marine and Coastal District; (5) a reasonable estimate of the number of trailered boats in the Marine and Coastal District; (6) total surface acres of marine waters within the state; (7) miles of shoreline in the Marine and Coastal District; (8) a review of NMFS marine recreational fishing catch data from 1979 to 1989; and (9) the approximate dollar value that marine recreational fishing contributes to state and local economies.

Most Westchester County officials believe that the greatest demand in the future among various types of water-dependent recreational activities will be for recreational boating. This will generate a demand for additional public boat launch facilities in waterfront parks. In most parks, these facilities are now heavily used. While space may exist in waterfront parks for additional boat launch facilities, the area required for such a facility is substantial, with space for parking being a major consideration. Therefore, there may be a strong reluctance to take space from current uses in existing parks. Adjoining neighborhoods may also take a dim view of the secondary impacts of increased traffic and activity such a facility would generate.

The New York City Comprehensive Waterfront Plan notes that the number of fishing access sites and public boat launching areas does not meet current, let alone future, demand. In the city's Sound study area, there are no public boat launch sites and only four official public fishing access sites. Evidence of demand is indicated by continued unofficial fishing at sites which are closed or present safety hazards.

In Westchester County, there will be a continued demand for swimming facilities, both at beaches and pools. The existing private shore and beach clubs are expected to satisfy a substantial part of this demand. A Town of Mamaroneck-Village of Larchmont official noted that closure of the private clubs would put a severe strain on public facilities; however, there was no indication from any officials that future demand for swimming would require additional facilities, given continuation of the existing private clubs. Moreover, officials from the county and the City of New Rochelle both said that beach attendance has been steady or declining in recent years.

Local officials noted a continued strong demand in their parks for non-water-dependent recreational activities, such as field sports and court games. In satisfying this demand, officials face limited park space that competes with other demands for water-dependent recreational activities, more appropriate from a coastal policy standpoint.

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Nonresident Visitors to the Region

Except for Playland Park in Westchester County, the four state parks on and near the Sound shoreline of Long Island, and some unrestricted boat launch and fishing access sites, there is little use of the public access and recreation facilities along the Sound by "tourists" or nonresidents. There are several reasons for this. Most coastal municipalities have residency restrictions preventing use of their facilities by nonresidents, particularly those facilities with active recreation, such as beach swimming. Tourists staying at local hotels are not considered residents and are thus unable to use local facilities, and there are few hotels on or near the Sound shoreline with their own facilities.

Sometimes the access and recreation facilities themselves do not contain the attractions that induce widespread use by persons outside the area, even if they are open to nonresidents. Thus, while New Rochelle's Five Islands Park has no residency restrictions and provides pleasant waterfront access with scenic views and passive recreation opportunities, it seems highly unlikely that these attractions alone would cause extensive use by nonresidents of the city, especially for those traveling any significant distance. Similarly, while public open spaces and conservation areas are generally open to all, total attendance figures from Westchester County's Marshlands Conservancy on the Sound indicate that this type of facility attracts relatively few persons, whether residents or nonresidents. The latest figures for visitors to Marshlands indicate a total 1991 attendance of 26,690. In contrast, Playland Park has averaged nearly one million visitors annually in the past five years, many of are undoubtedly from outside Westchester County.

Increases in nonresident visits to the Long Island Sound region for public access and recreation purposes are partially dependent on improvements to existing, and acquisition and development of new, state or state-funded facilities. For example, Caumsett State Park could use additional interpretive programs about its natural environment to encourage additional use for passive recreation purposes. Another state park, Sunken Meadow, has deteriorated areas needing repairs to improve access and recreation capacities as well as the quality of the experience of visiting the park.

Significance of Public Access, Recreation, and Open Space

While there is usually general agreement that public access, recreation, and open space are significant and have value for society, this significance and value have not always been quantified. One attempt to do so calculated the economic value of water-dependent activities related to public access and recreation for Long Island Sound (The Economic Importance of Long Island Sound's Water Quality Dependent Activities, U.S. EPA, Dr. Marilyn A. Altobello, January 6, 1992). For New York, adding together the user values, direct expenditures, and multiplier effects for beach swimming, sportfishing, and boating for Long Island Sound gives a total value of Long Island Sound recreation of approximately $2.238 billion annually.

The societal values and benefits of open space are discussed in "Conserving Open Space in New York." Those values important for the Sound region include the following:

- Parks, beaches, scenic landscapes, historic sites, lakes, streams, and coastal areas are central to the state's $17 billion dollar a year tourism and travel industry.
- Open land, scenic and historic sites, and the availability of recreation are important to the state's quality of life and thus are a primary factor in attracting and retaining economic investment.

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- Retaining open land can be the least-cost approach to environmental protection.
- Protection of open space can help shape growth in a way which saves money on public services.
- Parks and open space can enhance the property values of nearby residences.
- Open land and clean water sustain fish, wildlife, and plant species, all of which have economic as well as intrinsic value.
- Freshwater and tidal wetlands filter and process polluted water.
- Open, undeveloped land protects the quality of underground water supplies such as Long Island's sole source aquifer.
- Open, undeveloped land is essential if the state is to retain a diversity of plant and animal species.
- Open space systems, such as wetlands and barrier beaches, buffer settled areas from inland and coastal flooding.
- Parks and preserves can provide the opportunity for escape and relaxation for the state's residents.
- Forests, fields, beaches, and marshlands offer unique opportunities for education of people of all ages about our environment.

The significance and value of public access, recreation, and open space facilities around Long Island Sound for individuals are partly related to their residency and partly related to the distribution of the facilities. A nonresident of any Sound community or county, with no opportunities to make use of residency restricted public access, recreation, and open space facilities along the Sound, obviously attaches little significance to these facilities. Rather, the focus of nonresidents is on the need for additional facilities in all parts of the Sound region that can offer access for the general public. Similarly, major facilities along the Sound open to the general public, with the exception of facilities in New York City, tend to be farthest away from the largest population centers, perhaps diminishing their significance and value for many of the region's residents.

Residents of shoreline communities place a high value on their local public access, recreation, and open space opportunities. In every Local Waterfront Revitalization Program, this value is reflected and stressed. Major sections in each program are devoted to the analysis of issues, the establishment of policies, and the proposal of projects and programs for improving public access, recreation, and open space opportunities.

Local residents and their communities cite several reasons for the significance of the region's local public access, recreation, and open space facilities:

- Their aesthetic and recreational values have, in part, contributed to the high quality of life and desirability of the area as a place to live, and have helped maintain the high value of real estate. In turn, this provides a strong tax base that generates the revenues needed to support extensive public access and recreation areas and open spaces for local residents.

- Certain types of recreational activities, such as boating, are important to some local economies. For example, Mamaroneck Harbor, a significant recreational boating harbor in the region, is described as one of the village's most vital areas from an economic standpoint.

- The region's open spaces are extremely important from the standpoint of flood control, wildlife habitat, control of nonpoint source pollution, and the provision of passive

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recreational activities. In New York City's Sound area in particular, the significant number of open spaces are exceptionally valuable in light of the highly developed nature of the city's Sound waterfront.

- The numerous parks and open spaces in the coastal area are significant for their aesthetic values. With their natural or manmade landscapes, they relieve the monotony of development and are visually pleasing with their varying colors, forms, and varieties of vegetation, landform, and wildlife.

Issues and Opportunities

Access for the General Public

The one greatest widespread need for the region is to provide the general public with more opportunities to make use of the Sound's public access, recreation, and open space resources. This is particularly so in light of proposals to spend millions of dollars of public funds to improve the Sound's water quality. The residents of New York City, for example, have access to only four major facilities on the entire Sound shoreline outside of the city: Westchester County's Playland Park and three state parks in Suffolk County, one of which is largely a nature preserve. Legitimate questions can be raised about the expenditure of great sums of public funds on water quality improvements for the Sound, when most people in the state will have very limited opportunities to benefit from these improvements as they affect public access, recreation, and open space uses of the Sound.

The situation is exacerbated by the highly developed character of much of the Sound's shoreline, with the exception of eastern Suffolk County, which further limits opportunities to provide the general public with more public access, recreation, and open space facilities. In many areas, the nature and character of this shoreline development, together with the few facilities open to the general public and the exclusion of nonresidents from local parks, make it difficult for the general public to even see the Sound's waters. The existing restrictions against nonresident use of most local facilities are felt by many local residents to be strongly justified, and any proposals to change the restrictions would undoubtedly be vigorously fought.

The opportunities for increased general public access are unlikely to come from providing many more large, new facilities, although there is the possibility of one or more such facilities being established in eastern Suffolk County. Rather, opportunities are more likely to come from undertaking smaller, more incremental actions, such as making improvements at existing state parks, improving more local parks with state funds and thereby opening them to nonresidents, and increasing the number of state and state-assisted fishing access points, many of which are also boat launches.

It is important to emphasize that the fishing access points open to the general public should not completely exclude people from using these sites for other access purposes. They can be extremely valuable as access points for passive recreation of many kinds, such as nature study, photography, bird watching, or just relaxing and enjoying the views of land and water. They also can provide access to public trust lands, such as beaches, for walking and other passive recreation, important for nonresidents who have great difficulty finding access points to the shore.

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More Recreational Access Facilities

In its analysis of the 1991 Recreation Survey, SCORP indicates that the metropolitan area of New York City, including all of Long Island, has the greatest needs, because of the lack of adequate recreation facilities in the state's largest population center.

DEC's "Marine Recreational Fishing Access Plan" indicates a clear need for more marine recreational fishing access facilities throughout the region. The plan sets the following priorities for the first five-year phase of implementation, based on the assumption that a long-term, stable funding source will be established:

- Rehabilitate and/or expand as many existing **boat launch ramps** as can be identified and funded.
- Construct at least one new **fishing pier** in each county (Nassau, Suffolk, Westchester); rehabilitate and/or expand as many existing fishing piers as can be identified and funded.
- Acquire at least five new marine **beach access** properties in the Marine District. Priority will be to address areas on Nassau County's north shore and on Suffolk County's mid-north shore and east-end ocean, Sound, and bay shores.

A priority should be given to locating the above boating and fishing facilities in either the Areas for Concentrated Development or the Maritime Centers identified by the LIS CMP (see volume 2, chapter 5).

There is overcrowding everywhere at unrestricted public boat launch facilities, which are used by many to gain access for fishing. Fishing pier development is a high priority need especially in New York City, but all areas would benefit from such development. Gaining increased perpendicular access points to public trust land beaches for fishing is needed on Nassau County's north shore and on Suffolk County's mid-north and east-end Sound shores.

The provision of additional public boat launching sites presents challenges in highly developed areas because the amount of land needed for a launch site is fairly substantial. With very little vacant public waterfront land available, the construction of additional launch sites might involve taking land from existing public waterfront park uses. This, plus opposition to secondary impacts of increased traffic and activity by neighboring residents, may cause proposals to be controversial. However, proposals may be less so if they are small in scale and appropriate to their surroundings.

An alternative to a public boat launching site is a community boating and sailing center which rents small boats (rowboats, canoes, sailboats, etc). Such a facility could provide a significant amount of access to the water from a relatively small waterfront parcel.

Making more recreational access facilities available without actually increasing the supply can occur through the use of intermunicipal reciprocity agreements. Such agreements between municipalities would allow residents of a municipality to use access facilities of any other municipality that is a participant to the agreement.

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Safeguarding Existing Public and Private Open Space

The need to maintain the existing system of public and private open space, which includes private golf clubs and shore and beach clubs, particularly in the highly developed areas of New York City, Westchester and Nassau counties, and the western part of Suffolk County, is seen as essential for several reasons. These include: preserving the aesthetic character of the area; reducing stream flooding, particularly in Westchester County; protecting fish and wildlife habitats; reducing stream and harbor siltation; improving water quality in the Sound; and providing public access and passive recreation activities. While there are significant amounts of open space that are in public ownership and are thus protected, there is also considerable acreage in private golf clubs, shore and beach clubs, and undeveloped parcels. The development of these privately owned lands, especially in the highly developed areas noted above, could have substantial adverse impacts on drainage patterns, scenery, water quality, fish and wildlife, and recreation. Several of the shore and beach clubs on Davenport Neck in New Rochelle have ceased operations and remain vacant. A proposal was made in the last few years for future residential development of portions of the 140-acre Bonnie Briar Country Club in the Town of Mamaroneck, which has created concern about environmental consequences and engendered studies and recommendations for rezoning the town's golf courses.

Acquire Additional Open Space

In addition to maintaining existing public and private open space, it is equally essential to acquire additional open space before it is threatened by development. This is especially true for the more undeveloped reaches of Suffolk County, where the opportunity exists to preserve those parcels of open space that are most worthy of preservation for a variety of environmental, scenic, access, or recreational reasons. However, there are parcels throughout the region that are suitable for public acquisition as open space, as described in the plan "Conserving Open Space in New York State."

Maintain and Manage Existing Facilities

All governments throughout the region have a need to ensure that the quality of their existing public access, recreation, and open space areas is maintained. The need to establish a maintenance and management program for these areas is as crucial as providing the space itself. Too often, concern for the usefulness and quality of public spaces stops at the point of construction and does not take into consideration day-to-day operation and maintenance. Sufficient funds are necessary to maintain and manage the parks and open spaces in a condition that will allow continued full and appropriate public use consistent with their purposes. Admission fees for use of some facilities have traditionally been a source of funds for maintenance, but especially for many types of local parks, admission fees are impractical. Funds for maintenance must then come from local revenue sources.

A Court of Appeals decision interpreting the Public Health Law with respect to the provision of toilet and washing facilities at bathing beaches has left municipalities with the possibility of having to provide such facilities at each and every street end or other waterfront access point where swimming is possible. The expense to a municipality of carrying out this decision may lead to the closing of such access points, thus depriving residents of opportunities to gain access to the shore for a wide variety of purposes other than swimming. Legislation is required to clarify the appropriate Public Health Law provision to have it apply only to those beaches operated as recreational facilities.

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Funding for New Facilities

A major need is funding for the acquisition and/or development of general public access, recreation, and open space facilities at both state and local levels, particularly in the absence of significant state funds, which were previously available through various bond acts. The state Environmental Protection Fund is an important new source of funding for these facilities. The amount of federal Land and Water Conservation funds available to New York has declined significantly in recent years, currently amounting to about one to two million dollars per year. This small amount is used for a mixture of state and local projects. For capital development of state parks, a State Park Infrastructure Fund has been established for use by OPRHP. The fund, supported by park admission and other fees, will provide $300 million over ten years.

Opportunities for alternative sources of funds are sometimes available, either through private sector sources associated with waterfront development or through revenue-producing activities on waterfront public lands.

Use of Regulatory Techniques

With the scarcity of public funds available to purchase valuable private open space and waterfront access threatened by development, municipalities have opportunities to use regulatory techniques to prevent the adverse consequences of development and to promote public physical and visual access to or along the waterfront. However, this latter requirement is not conditioned on the existence of any specific state enabling legislation as authority for requiring, for example, developers to provide public access to coastal lands and waters. As pointed out in "Public Access to the New York Shoreline" (New York State Department of State, 1988), "Local regulations pertaining to zoning and subdivision of land have, thus far, served as inadequate authority for requiring public access from developers of coastal land" (p. 154). Nevertheless, the study does indicate that the state's zoning enabling legislation gives some authority to municipalities to promote public access to the waterfront, as follows:

- The local comprehensive plan can be adopted or amended to express a policy of improving the waterfront and public access and places along it.
- The heights and density of buildings in the waterfront zone can be limited to preserve visual access to the water from the nearest road.
- Fences can be restricted or prohibited on the public foreshore and to a more limited extent on privately owned foreshore in which the state or local government has granted away all rights.
- Only water-dependent land uses such as boat yards, marinas, beach clubs and public recreation areas can be listed as permissible land uses for the waterfront district.
- Reasonable public access can be listed as a requirement for all special permitted uses in the waterfront district.
- Cluster development can be approved to preserve the natural and scenic qualities of open lands, where appropriate.
- Municipalities may engage in incentive or bonus zoning which allows the developer to exceed limitations imposed by the zoning ordinance, if the developer agrees to certain

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things specified in the ordinance. For example, under a bonus or incentive zoning system, a developer could receive a density bonus in exchange for providing additional amenities, such as a waterfront promenade open to the public.

In addition to zoning requirements, village, town, and city laws governing the subdivision of land enable municipalities to require that recreational parks be provided as a condition of plat approval or, if impractical, that monies be provided by the developer for use by the municipality for park acquisition or development elsewhere.

The state Coastal Management Program consistency review process, which requires that state and federal actions be consistent with the state's coastal public access and recreation policies, among others, provides opportunities at the state level to obtain physical and visual public access as a condition for the approval of public and private development on the waterfront under certain circumstances. When development by a public agency or authority is being undertaken, there is very little question that public access must be provided to the extent appropriate for the site and the nature of the proposed development and consistent with public health and safety.

While there is no explicit state authority to condition approval of proposed private development in the coastal area on mandatory dedication of public access without just compensation, there are mitigating circumstances under which physical or visual public access can be obtained. Examples include instances where the proposed development may require the purchase of publicly owned land as part of the project, when public access or recreation would be adversely affected by the development, or when visual access for the public exists and the proposed development would adversely affect or remove the visual access.

Improve Publicly Owned Non-Park Land for Public Access

There are opportunities for improving waterfront public access on state and municipally owned non-park lands, especially when facilities on these lands are developed, improved, or current uses are discontinued. While not all such lands can provide access, the potential for providing access should be evaluated at what might appear to be unlikely candidates. For example, the Tallman Island Sewage Treatment Plant in Queens successfully incorporated public space along the water's edge.

It is also important to look at all publicly owned non-park waterfront lands, even if there are no plans for development, to determine if they can be currently used for waterfront access. An example is historic Fort Schuyler at the end of the Throgs Neck Peninsula in the East Bronx. Home of the New York State Merchant Marine Academy, the entire site is an historic and spectacularly scenic resource which contains the historic fort, a maritime museum, piers where large vessels dock, and excellent views of the East River and the Long Island Sound. While the museum is open for limited hours, the entire site is rarely visited by the general public. This underutilized waterfront resource, from a public access point of view, offers the potential for increased public use without interference with its primary function.

Another prominent publicly owned non-park waterfront site with great potential for providing waterfront access is Fort Totten, a 147-acre federal military installation located on a peninsula at the western entrance to Little Neck Bay in Queens. While previous efforts to have this site made available for public use have been unsuccessful, renewed efforts should be undertaken.

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Excellent opportunities for new or improved point access, scenic overlooks, or visual corridors are available from streets terminating at the shoreline. Existing restrictions against nonresident parking at the many street ends on the north shore of Long Island and along the shoreline in Westchester County need to be reviewed for their legality in light of a court decision preventing the City of Albany from restricting nonresident parking on its public streets. Also, the state's Community Highway Improvement Program (CHIP), which provides state funds to communities for local highway improvements, should be reviewed to determine if it could be used to ensure, through application of the state Coastal Management Program consistency review process, that nonresidents have the same parking rights as residents at street ends on the Sound. While New York City has taken advantage of many street ends for improved public access, many public street ends on City Island have been taken over by adjacent landowners or neighborhood associations, which then illegally prevent the general public from using them. The City of New York should take the appropriate actions to ensure that these street ends are reclaimed for use by all of the public.

Provide Public Access and Recreation through Redevelopment Activities

There are some areas, such as along Glen Cove Creek, Hempstead Harbor, and Mattituck Creek on the North Shore of Long Island, where intensive industrial uses in the past have left many deteriorated, unattractive, and underutilized sites, some of which are contaminated with toxic materials. There are opportunities in such areas for developing marine commercial uses to serve recreational boating, furthering public physical and visual access by establishing waterfront walkways and linear parks, developing active and passive recreational parks, and restoring and protecting natural areas.

County and town-owned lands along and adjoining the west shore of Hempstead Harbor offer a particularly attractive opportunity for an integrated waterfront and upland redevelopment scheme to provide the general public with enhanced physical and visual access to the waterfront, a variety of waterfront and upland recreation activities, and preservation of natural areas. The approximately 960-acre site is entirely publicly owned and includes the Port Washington Sand Pits, Nassau County's Hempstead Harbor Park, the Town of North Hempstead's Bar Beach, and the North Hempstead Town Landfill. The North Hempstead Park and Recreation Facility Feasibility Study, a federally funded study matched by funds from the Sierra Club Foundation, proposes that the site be developed into a regional park that includes both active and passive waterfront and upland recreation facilities, two golf courses, and protected natural areas. This proposal is an alternative to other proposals for a mixed use redevelopment of golf courses, commercial properties, and housing. To provide funding assistance and to ensure that the general public could use the facilities, the state could financially participate in the redevelopment, through such means as acquiring some of the existing county waterfront facilities. While intensive water-dependent recreational uses in the form of a full scale marina would not be appropriate for the site, smaller scale uses, such as mooring areas in the lower harbor and boat launch sites, would be compatible. The detailed plans for redeveloping the site in accord generally with the feasibility study proposal should be included as part of the Town of North Hempstead's Local Waterfront Revitalization Program.

Greenways, Blueways, Wildlife Corridors, Bikeways, and Walkways

Existing parks and open spaces near and along the Sound shoreline offer the opportunity for establishing important linkages in the form of greenways and blueways that would improve access to the coast and to coastal recreational facilities. As noted above under "Acquire

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Additional Open Space," it is also essential to acquire additional open space before it is consumed by development. An important objective for acquiring this open space can be the development of greenways, particularly for the more undeveloped stretches of shoreline in Suffolk County.

Greenways can be as simple as pedestrian linkages between parks or open spaces that would indicate particularly attractive or interesting corridors for community residents to walk in and between, or walkways around the edges of the Sound's many harbors that would allow pedestrians visual access to the always interesting sights and activities taking place. Other greenway linkages can be established between conservation areas to encourage the protection of valuable fish and wildlife species and other environmental values and to retain visually attractive, natural corridors that interrupt the flow of development as well as enhance its setting. Chapter 2, The Natural Coast, refers to these as "wildlife corridors," and calls for development of a wildlife corridor plan for the Long Island Sound coastal and watershed areas. Within these wildlife corridors, there are opportunities to include bikeways and pedestrian routes where compatible with the protection of wildlife.

In New York City, there are proposals for a Brooklyn-Queens Greenway that would connect an already existing greenway-trail system along Little Neck Bay from Fort Totten to Alley Pond Park to the Atlantic Ocean at Coney Island. New York City has also formed a bicycle and pedestrian working group to develop a plan for on-road bikeways, off-road multi-use trails, and other related programs, as a first step to obtain funding under the 1991 Federal Intermodal State Surface Transportation Efficiency Act, which may be used for bikeways and pedestrian trails.

On Long Island, the non-profit Long Island Greenbelt Trail Conference, Inc. has taken an active role in building and maintaining hiking trails that take advantage of greenway links between parks and open space throughout the island. Two of their trails, the Long Island Greenbelt Trail and the Nassau-Suffolk Greenbelt Trail, have portions located within the north shore coastal area. A substantial portion of the Long Island Greenbelt Trail's northern section from Sunken Meadow State Park south along the Nissequogue River to Caleb Smith State Park is within the coastal area. A smaller portion of the northern end of the Nassau-Suffolk Greenbelt Trail is also within the coastal area as it extends south from Cold Spring Harbor.

Another type of linkage between waterfront parks is a blueway, a course for hand-launched boats along the waterfront delineated by buoys, and including signage identifying each resting point. The New York City Department of Parks and Recreation is proposing such a blueway along Little Neck Bay from Alley Pond Park to Flushing Bay Marina. Blueways may be developed independently or in concert with greenways, in order to improve opportunities for public access to the water.

The establishment of an effective greenway-blueway system for the Long Island Sound region would require an extensive network, crossing many municipal boundaries. The need for intermunicipal cooperation and coordination in establishing such a system requires a regional approach. The development of a regional greenway-blueway plan for the Sound would be a logical first step that would integrate existing greenway linkages with new proposals into a regional system.

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Locating Public Access Sites and Facilities

Finding public access, recreation, and open space sites and facilities can often be a challenge. The development and use of a universal symbol for public access should be considered. The universal symbol could be promoted in conjunction with the development of a uniform sign system. In addition, state and regional maps for use by visitors should indicate those public access, recreation, and open space sites and facilities that are open to the general public.

Also, the general public is often unaware of opportunities for obtaining access to the lands and waters of the Sound, in addition to those opportunities provided by the few well-known state parks. The availability of a public access guide would enable the public to seek out those other lesser known locations which are also open to the general public but which may not offer the types of active recreation found in the state parks. These would include public and private nature preserves, historic sites, municipal and county parks, street ends, etc., many of which offer opportunities for a variety of passive recreation such as hiking, nature study, birdwatching, or photography. The guide would also indicate locations providing visual access to the Sound.

Managing Conflicts Among Recreational Uses

Conflicts among recreational uses are an issue at some public access and recreation areas. The use of all terrain vehicles (ATV) on beaches and dunes is often incompatible with fishing, sunbathing, and other passive recreation, and can be damaging to natural resources. The operation of jet skis in near-shore waters can be dangerous to swimmers and damage or destroy fishing gear and fragile wetlands. It is essential that conflicts between these uses and resources be minimized without completely restricting the use of ATVs or jet skis.

SHIPWRECKS AND RECREATIONAL DIVING

The Long Island Sound region contains one of the most diverse environments for recreational diving in the country. It includes rocky nearshore areas, sandy and muddy offshore areas, an extensive variety of shipwrecks and other man-made objects, and a wide range of plant and animal species that inhabit these areas. Both shore-based diving and diving from private and charter boats take place on Long Island Sound.

Recreational diving using self-contained underwater breathing apparatus (SCUBA) is the fastest growing water-dependent recreational activity in the region. The recreational diving industry estimates that there are more than 80,000 certified recreational divers in Nassau and Suffolk Counties alone, and that dive shops in the region are certifying approximately 4,500 new recreational divers a year.

There are hundreds of shipwrecks located within Long Island Sound, including historic 17th century vessels, paddle wheelers and steamers, ships of war from the first and second world wars, tugs and barges, and private pleasure vessels of all sizes and shapes. Many of these wrecks are of historic and archaeological value, while others are nothing more than rusting or rotting hulks of debris lying on the bottom of the Sound. All of these wrecks are, however, of interest to professional and sport divers, and many of them have become artificial reefs which provide habitat for various marine vertebrates and invertebrates. An example of a commonly known early 20th century shipwreck is the side paddle wheel passenger steamer "Glen Island" that sank in 1904 and rests in approximately fifteen feet of water off Glen Cove on Long Island's north shore.

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Issues and Opportunities

Despite the growing popularity of recreational diving, access to the shoreline and boat ramp access for recreational divers on Long Island Sound are extremely limited. All state parks on Long Island Sound prohibit diving from shore and within the offshore boundaries of the parks, unlike state parks in California which encourage diving.

Pursuant to the Abandoned Shipwrecks Act of 1987, the United States asserted title to all abandoned shipwrecks in submerged lands of the state, and transferred this title to the state. The Act states, in part, " . . . In order to . . . clarify that . . . shipwrecks offer recreational and educational opportunities to sport divers and other interested groups, as well as irreplaceable state resources for tourism, biological sanctuaries, and historical research . . . reasonable access by the public to such abandoned shipwrecks . . . " should be permitted by the state, consistent with policies to " . . . protect natural resources and habitat areas; guarantee recreational exploration of shipwreck sites; and allow for appropriate public and private sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity of the shipwrecks and the sites."

No federal or state survey or inventory of shipwrecks has ever been conducted in Long Island Sound. Almost every shipwreck in Long Island Sound has been found by amateur divers. The locations of many of the more historically significant vessels are kept secret by those who discover them, primarily out of fears of the vessels being stripped or disassembled by other divers, or out of fear of the state claiming ownership of artifacts having historical significance or value and removing it from the finder's possession.

Most vessels that have been discovered by divers have been stripped of artifacts or anything else that can be removed, including portions of ship's wooden hulls with identifying marks. Many other vessels are of historic significance and should be protected or preserved by the state for their historic or archaeological value and importance, just as other historic or archaeologically important finds are protected. Identifying these resources and ensuring access to them, while protecting those of historic and archaeological importance, is extremely difficult.

UNDERWATER LANDS, THE FORESHORE, AND THE PUBLIC TRUST

Also important for public access to coastal resources are public trust lands—foreshore and underwater lands held in trust by the state or local government under the public trust doctrine for the benefit of the public.

As development has spread eastward along the Sound in Suffolk County, many informal access points on privately owned undeveloped land, used for many years by commercial and recreational fishermen and others to reach state or town-owned public trust lands, have disappeared or, where still existing at street ends, are prohibited for use by nonresidents. This inability to obtain access to public trust lands, which are open for use by anyone for a variety of recreational and other purposes, has increasingly become a problem as ever larger portions of the state's coastline are devoted to private residential, commercial, and transportation uses.

In many highly developed urban areas, it is almost impossible to reach public trust lands along the waterfront because of industrial and commercial land uses, decaying piers and

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bulkheads, abandoned buildings, or other impediments to access. Often, it is only when such areas are redeveloped that opportunities arise to improve waterfront access. In less densely developed suburban areas, it is usually just as impossible to reach public trust lands in many locations because of the continuous strip of waterfront residences, difficult terrain, such as high bluffs, or lack of road access. In some of these areas, if public trust lands can be reached, the proliferation of long docks into the water blocks lateral access along public trust lands, and obstructs and encumbers public trust uses of surface waters and underwater lands for such activities as swimming and small craft boating.

In conjunction with spreading development, many shore hardening structures in the form of bulkheads, sea walls, revetments, and groins have been built, ostensibly to protect developed property from erosion. However, in many cases the result has been a narrowing or even loss of the beach, which reduces or eliminates opportunities to use public trust lands for lateral access along such shores.

New York's marine coast has the potential to offer a continuous right of access along the shore. Given the dense population and developed nature of the Long Island Sound coast, the opportunity to walk from Orient Point to the border of Connecticut is a valuable public asset. It remains, however, largely a theoretical asset because the right of continuous access is useless without the ability to get to the shore and, once on the shore, to walk unfettered. On the Long Island Sound shore, the public's rights in the foreshore have been constrained, and sometimes precluded, by private development. This is a major public policy concern.

PUBLIC TRUST DOCTRINE

The legal geography of New York's beaches, tidelands, and lands underwater is defined by the public trust doctrine and the court cases that interpret its application. The public trust doctrine is the basis for the public's right to swim, fish, and walk along the Sound.

Under the public trust doctrine, the foreshore and underwater lands are held in trust by the sovereign for the benefit of the public. In the colonial era, the English king exercised sovereign authority, both proprietary and governmental, over Long Island Sound. Following the Revolutionary War, New York succeeded to the crown's rights in the waters, soils, and shores of Long Island Sound.

Tidality is the linchpin in establishing the public's right to use and pass over the foreshore of navigable waters. In Tucci v. Salzhauer, a case involving the use of land in Hempstead Harbor, the court defined the public's rights in the foreshore:

> When the tide is in, he may use the water covering the foreshore for boating, bathing, fishing, and other lawful purposes; and when the tide is out, he may pass and repass over the foreshore as a means of access to reach the water for the same purposes and to lounge and recline thereon. (336 NYS2d 721)

New York courts have long upheld the principle stated in Illinois Central Railroad v. Illinois, 146 U.S. 387 (1892). In this landmark case, the Supreme Court held that the state cannot divest itself of its public trust interest. In Illinois Central, the court said that the state's title to underwater land:

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> . . . is a title different in character from that which the state holds in lands intended for sale . . . It is a title held in trust for the people of the state that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties.

New York State has the power to grant interests in state-owned underwater lands to owners of adjacent uplands, subject to the restrictions of the public trust doctrine. In Coxe v. State, 144 N.Y. 396 (1895), the Court of Appeals said that the title of the state to the foreshore is:

> (A) sovereign right, and it has been said that a trust is engrafted upon this title for the benefit of the public of which the state is powerless to divest itself . . . .The title which the state holds and the power of disposition is an incident and part of its sovereignty that cannot be surrendered, alienated or delegated, except for some public purpose, or some reasonable use which can fairly be said to be for the public benefit.

Application of the Public Trust Doctrine Within Long Island Sound

Almost all of the Long Island towns were created by royal charters and patents, which created not only the corporate bodies with the power of government, but also conveyed title to the land and land under water within the bounds of the town. Although New York State has never relinquished its territorial authority or legislative jurisdiction, the state constitutions until 1962 have confirmed the various colonial charters vesting interest in upland commons and land underwater in the towns, or the trustees of the freeholders and commonalty of certain Long Island towns. The colonial charters have also received judicial recognition. The state has recognized the grants from colonial governors and the state legislature giving New York City the authority to administer underwater lands for the purpose of improving its waterfront. Submerged lands have been conveyed by the state and towns to private owners for commercial purposes and to develop waterfront infrastructure. Thus, with few exceptions, the ownership of most lands underwater, or formerly underwater lands that are vested with a public trust, is in three forms: (1) state ownership; (2) local government ownership; or (3) private ownership, either by grant from the state or town. In most instances where publicly owned underwater lands have been conveyed into private ownership, the public trust interest remains intact.

Westchester County

The municipalities in Westchester County were formed from lands given as private patents to individuals. As a result, these municipalities do not hold colonial grants to underwater lands. Since 1786, however, New York State has conveyed underwater lands to municipal and private owners of adjacent uplands. These grants have taken several forms, including grants for full beneficial enjoyment, conditional beneficial enjoyment, restricted beneficial enjoyment, commerce or beneficial enjoyment, and commerce. The rights conveyed by these grants vary from private use or the potential for private use (full beneficial enjoyment grant) of trust lands, to limited use for a specific water-dependent business (commerce grant).

With the exception of a study of underwater lands undertaken jointly by the New York State Department of State and the Village of Mamaroneck, the pattern of ownership of trust lands in Westchester County remains undocumented.

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The character of Mamaroneck Harbor is typical of many of the communities located on Long Island Sound. Over the course of the 19th and 20th centuries, the state has conveyed almost the entire extent of the Mamaroneck shoreline for municipal and private use. The Village of Mamaroneck study found that 66 grants and easements, totalling about 245 acres of underwater lands, were conveyed in the harbor. Of the 56 land grants made by the state, 11 were for full beneficial enjoyment (issued between 1892 and 1899); 19 were for conditional beneficial enjoyment; eight were for restricted beneficial enjoyment; 17 were for the purpose of commerce or beneficial enjoyment; and one was for commerce. Ten easements and no leases were conveyed. As a result of this activity, many areas within the harbor have been filled and bulkheaded, resulting in the shoreline becoming private and the public foreshore being eliminated.

New York City

The manorial grants to lands in the Westchester County towns that were later incorporated into New York City as the Borough of the Bronx, did not convey lands below the high water mark. Some time later, underwater lands within the Sound were conveyed by the state to New York City as part of Pelham Bay Park. Lands underwater within the Borough of the Bronx that are ungranted are owned by the state.

Similarly, lands underwater in Long Island Sound within the boundaries of the towns incorporated into the Borough of Queens were not conveyed in the colonial grants. In an opinion issued to the commissioners of the land board, dated November 17, 1893, the attorney general stated that "there is no patent which has been produced granting to the Town of Hempstead or its successor in interest, the Town of North Hempstead, any harbors or havens as far northerly as Long Island Sound." Thus, within the Borough of Queens, lands not conveyed by the land office or its successor agency, the Office of General Services, remain in state ownership.

Through the New York City charter, the New York State legislature authorized the commissioner of the New York State Land Office to convey land underwater deemed necessary by the New York City commissioner of docks for the construction of "wharves, docks, piers, bulkheads, basins, and slips". Lands conveyed and improved through these provisions are inalienable, but can be leased for limited periods. Underwater lands which have not been improved for port purposes are deemed to be subject to public rights.

New York City charters have made a distinction between "waterfront property", which includes city-owned property fronting on tidal waters, including underwater land and upland (to the first street or first adverse owner), and "wharf property," comprising improvements such as piers and bulkheads. Wharf property was reserved for active port development until a 1991 charter amendment enabled the new Department of Business Services to lease wharf property for purposes other than commerce. Waterfront property, underwater lands, ferries, wharves, docks, and waterways, according to Section 383 of the city charter, are inalienable and cannot be sold without authorization from the state legislature.

Nassau County

The boundaries of patents to towns along the north shore of Long Island end at the high water mark of Long Island Sound (Loondes v. Town of Huntington, 153 U.S. 1 (1894)). Title to the foreshore of and submerged land under Long Island Sound is vested in the New York State, unless otherwise conveyed by the state. Within the original towns of Long Island, colonial grants gave control of tidewaters of coves, bays, and rivers to the towns.

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In the Town of North Hempstead there has been much contention over ownership of the lands underwater in Hempstead Harbor and Manhasset Bay. New York State, through its land office, granted parcels of land underwater in this area beginning in the late 1800s. Also, in 1893 and 1901, the state attorney general published opinions stating that Town of North Hempstead patents could not be interpreted to include Little Neck Bay, Manhasset Bay, or Hempstead Harbor. However, the Town of North Hempstead interprets the Kieft Patent of 1644 and the Dongan Patent of 1685 as granting Manhasset Bay and Hempstead Harbor to the town. In 1967, a court reaffirming a 1917 decision found that the town held title to the underwater lands in Manhasset Bay (Riveria Association Inc. v. Town of North Hempstead, 52 Misc. 2d 575, 276 NYS2d 249 (Sup. Ct., Nassau County, 1967), aff'd by reference, Mannor Marine Realty v. Wachtler, 22 N.Y. 2d 825 (1968)). The only portion of Hempstead Harbor and the associated underwater lands owned by the town with the consent of the state is located south of Bar Beach, as described by New York Laws of 1966, Chapter 508.

The Town of Oyster Bay claims ownership to the following waters and underwater lands: Oyster Bay, Oyster Bay Harbor, South Oyster Bay, Mill Neck Creek, and Cold Spring Harbor. This claim is.based on the Andros Patent of September 29, 1677. A substantial part of these lands underwater was transferred to the U.S. Fish and Wildlife Service by Deed Liber 7929, cp 28 filed in the office of the Nassau County clerk. These lands are part of the Oyster Bay National Wildlife Refuge.

The Town of Oyster Bay owns the submerged land of Cold Spring Harbor by patent. This ownership had been contested by the Town of Huntington, which claimed the eastern portion of Cold Spring Harbor because of the existing mid-harbor boundary. Huntington's claim was overturned by the decision in Nance v. Town of Oyster Bay, 41 Misc. 2d 446, 244 NYS 2d 916 (Sup. Ct., Nassau County, 1963), and affirmed 23 AD 2d 9, 258 NYS 2d 156 (Second Dept., 1965). The appellate court stated that the submerged land of Cold Spring Harbor to the high water line of Huntington belonged to the Town of Oyster Bay by virtue of its colonial patents.

Underwater lands within Caumsett State Park were transferred by the Office of General Services to the Long Island State Park and Recreation Commission.

Suffolk County

The Town of Huntington lays claim to all lands underwater within its bounds by virtue of several colonial patents: the Nicolls Patent, November 30,1666; the Dongan Patent, August 2, 1688; and the Fletcher Patent, October 5, 1694. These lands, although now generally accepted as within town ownership, were from time to time disputed. The state clarified town ownership of Huntington Bay in the New York Laws of 1888, Chapter 279. This law established a northern line limiting the town's jurisdiction in the bay. The town's title to lands underwater flowing from the three patents noted above was confirmed in Knapp v. Fasbender 1 NY 2d 212, 151 N.Y.S. 2d (1956).

Unlike the other towns in Nassau and Suffolk counties, the Town of Smithtown enjoys only limited rights to portions of the foreshore and underwater lands. Smithtown was formed from private patents to Richard Smith from Governor Nicolls in 1665 and Governor Andros in 1677. The grant ran only to the mean high water and included no foreshore or underwater lands. As a result, the state holds title to land below mean high water. In 1895, 1910, and 1953, the state ceded portions of the Nissequogue River, Smithtown Bay, and Stony Brook Harbor to the town for shellfish management and navigation (New York State Laws of 1895,

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Chapter 952; New York State Laws of 1910, Chapter 343; and New York State Laws of 1953, Chapter 776).

In the Town of Brookhaven, the waters and underwater lands of Port Jefferson Harbor, Setauket Harbor, Conscience Bay, and Mount Sinai Harbor are owned by the town under the Nicolls Patent of March 7, 1666, and the Dongan Patent of December 27, 1686.

The Town of Riverhead was formed from the Town of Southold (New York Laws of 1792, Chapter 24). Since Riverhead does not predate the Revolution, colonial patents do not apply to the town. In 1964, Riverhead obtained quit claims from the trustees of Southold of all rights in land within Riverhead Town. Such conveyance did not include lands under Long Island Sound. The jurisdiction for lands underwater adjacent to Wildwood and Orient Beach State Parks was transferred by the New York State Office of General Services to the Long Island State Park Commission.

The Town of Southold lays claim to its lands underwater by virtue of the Andros Patent of October 31, 1676. The actual waters included were partially clarified by litigation in Town of Southold v. Parks, 41 Misc. 456, 84 NYS 2d (Sup. Ct. Suffolk County, 1903) affd. per curiam 97 App. Div. 636 (Second Dept., 1904), affd. mem. 183 NY 513 (1905). This case described the southern boundary of Southold as the high water mark of Gardiners and Peconic Bays. Southold's town ordinances of 1944 and 1949 described town waters as all land underwater in any harbor, bay, or creek, and including "all waterways and creeks cutting the shoreline of the town to the average high water mark from headland to headland."

In Nassau and Suffolk counties, the tidally influenced public trust lands are administered by the towns or trustees for the benefit of the people of the towns, and for the public generally. The towns and town trustees may give leases, easements, or grants for the use of trust property, and they may set rules governing access to and use of trust lands.

Significance of Trust Lands

The use of trust lands by the public generates billions of dollars for the state economy. The foreshore and underwater lands of Long Island Sound are used for recreation, boating, fishing, swimming, and visual enjoyment of the Sound's environment. The tidal areas provide habitat and breeding areas for shellfish and finfish of commercial and recreational importance. Private actions that interfere with these activities diminish the public's use and enjoyment of these commercially and recreationally productive areas.

In 1992, the legislature amended the Public Lands Law (Laws of 1992, c. 791) codifying, in part, the public trust in underwater lands. The legislature found that regulation of projects and structures, proposed to be constructed in or over state-owned lands underwater, was necessary to responsibly manage the state's proprietary interests in trust lands. Additionally, the regulation would severely restrict alienation into private ownership of public trust lands owned by the state. The intent of the amendment was also to ensure that waterfront owners' reasonable exercise of riparian rights and access to navigable waters did not adversely affect the public's rights. The legislature stated that use of trust lands is to be consistent with the public interest in reasonable use and responsible management of waterways for the purposes of navigation, commerce, fishing, bathing, recreation, environmental and aesthetic protection, and access to the navigable waters and lands underwater of the state.

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Issues and Opportunities

Perhaps the most significant threat to underwater lands has been the tendency of the courts and trust authorities to treat each underwater parcel as a discrete commodity, and not to examine the cumulative consequences of conveyances. While a single facility located on underwater lands will usually have little impact by itself, a large number of installations will have significant cumulative impacts on the region. The Mamaroneck Harbor case study of underwater land ownership shows how a policy of small individual conveyances can result in the alienation of almost an entire water body. In other instances, for example, a single, large grant of land or similar area, the courts have held to be an impermissible abdication of legislative authority (Marba Sea Bay Corp. v. Clinton St. R Corp. 272 NY 292, 5 N.E. 2d 824).

Table 15 Distribution of Docks 100 Feet or Longer, Nassau and Suffolk Counties

	DOCKS > or = 100'	LENGTH OF COAST	DOCKS PER MILE OF COAST
Nassau County	176	80.4	2.19
county line - Hewlett Point	27	5.2	5.19
Hewlett Point - Sands Point	62	14.1	4.40
Sands Point - Dosoris Island	34	17.4	1.95
Dosoris Island - Lloyd Point	53	43.7	1.21
Western Suffolk County	79	53.7	1.48
Lloyd Point - Eaton's Neck Point	79	43.6	1.81
Eaton's Neck Point - Sunken Meadow State Park	0	10.1	0.00
Central Suffolk County	27	51.5	.53
Sunken Meadow State Park - Crane Neck Point	9	28.3	0.32
Crane Neck Point - Mt Sinai Harbor inlet	18	23.2	0.78
Eastern Suffolk County	42	93.1	.46
Mt. Sinai Harbor inlet - Aldrich Lane (west of Mattituck Inlet)	15	29.0	0.52
Aldrich Lane (west of Mattituck Inlet) - Orient Point and shoreline of Plum Island	1	40.02	0.02
Shorelines of Fishers Island, North Dumpling Island and South Dumpling Island	26	23.9	1.09

Another important cumulative impact on underwater lands in the Sound is the proliferation of private docks, many exceeding 100 feet in length, within the shallow waters of harbors. In some instances, docks and catwalks have extended more than 600 feet into public trust areas. As the number of these long docks and other private obstructions increases along the Sound, convenient access to navigable water and along the shoreline for the general public

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becomes more difficult to obtain, and the general public is increasingly excluded from public trust lands. This is a particular problem within shallow embayments, where shoreline residents often seek to extend their docks for convenient access, presenting conflicts with the preservation and public use of the trust resource. Not only is lateral pedestrian access along the foreshore compromised, but use of the surface waters for navigation and shellfishing is also adversely affected. On Long Island, for example, the greatest number of long docks, greater than 100 feet in length, are located in the most intensively used harbor centers at the westerly end of Nassau County. These are also the most densely populated areas of the Sound coastal area where public access is at a premium. Table 15 illustrates this issue.

Once access is obtained to public trust shorelands, the opportunities for lateral access along significant distances of these shorelines have diminished over the years due to increased shoreline development and associated shoreline hardening structures which have been built to protect against erosion. There are often insurmountable difficulties of crossing legal and illegal shoreline obstructions, such as fill and structures, as well as long docks. Requirements that these obstructions be removed or that access be provided around, under, or over them would constitute a relatively low cost opportunity for the public to regain the ability to traverse long distances of public trust shorelines. Furthermore, the use of the foreshore, nearshore surface waters, and underwater lands for recreation activities is being particularly inhibited by long docks.

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Chapter 4

The WORKING COAST

Reinvigorate the Sound's working waterfront, its jobs and products, at appropriate locations by protecting uses dependent on the Sound, furnishing necessary infrastructure, providing business and marketing assistance, and promoting efficient harbor operation.

The working coast consists of uses and businesses that share a common trait: they require a location on the shoreline to function, or they depend on harvesting living or mineral resources in coastal waters. Protecting and promoting Long Island Sound's working coast uses are important to the region's maritime heritage and economy.

Long Island Sound, nearly 110 miles in length and 21 miles in width at its widest point, with an area of 1,300 square miles and an average depth of 80 feet, provides an environment conducive to working coast uses few other water bodies can match. The Sound's many harbors and bays provide safe ports for commercial and recreational vessels. A variety of significant fisheries exists both inshore and in deeper waters. Although the Sound is sheltered from the ocean, access to sea lanes through the East River to the west and Block Island Sound to the east is convenient.

These desirable conditions have made the Long Island Sound a place where water-dependent uses have flourished. During colonial times, ports were established to transport timber, grain, menhaden, livestock, and whale products. Due primarily to the reliance on ships as the basic means of transportation, several communities in the region became shipbuilding centers during the first half of the nineteenth century. Beginning in the latter half of the nineteenth century and the early twentieth century, the Sound became increasingly popular for yachting and excursion boats. Shipbuilding once again became a major focus during World Wars I and II to meet national defense needs.

Today, there are nearly 200 working coast uses located along the Long Island Sound shoreline. The Sound working coast consists of areas where individual public or private marinas, yacht clubs, and boat yards exist; concentrations of commercial or recreational fishing vessels exist; petroleum products, aggregates, or other waterborne commerce are imported or exported; or ferries arrive or depart from the shore. Most of these uses and activities are clustered in sheltered bays and harbors that have historically been developed with water-dependent commercial and industrial uses. These sheltered bays and harbors, or maritime centers, are essential for waterborne commerce and recreation, and are important components of the state's transportation system. The balance of working coast uses is dispersed along the Long Island Sound shore. The locations of these uses are shown on maps 13.0-16.6. Agriculture, a working coast use, is discussed in this chapter, although it is not reflected in the figure above or shown on the maps.

The working coast generates billions of dollars for the regional economy and is vital to the economic health of the region. A report prepared for the Long Island Sound Study, The Economic Importance of Long Island Sound's Water Quality Dependent Activities, estimates that the total 1990 use value to New York State of recreational boating and recreational

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fishing alone was in excess of $1.8 billion. The total use value was calculated by adding estimates for use value plus the economic impacts or multiplier effects resulting from the use. The $1.8 billion figure does not include other significant economic activities on the Sound, such as commercial fishing, ferry transportation, waterborne commerce, and industrial uses; it also does not include the value of the Sound's natural resources. Although recreational boating and fishing are the predominant water-dependent uses on the Sound, other water-dependent commercial uses and activities contribute significantly to maintaining the diversity and economic balance in the region. Thousands of New Yorkers earn their livelihood from Long Island Sound-based coastal businesses and support services.

The economic contributions of working coast uses to the region could be enhanced if the factors that significantly impair their ability to function were better understood and addressed by state and local government and the public. Some of the challenges facing water-dependent businesses include: competition for space on the waterfront and space in the water; inadequate or deteriorated coastal infrastructure; impacts of regulation and taxation; degradation of coastal resources; and a lack of public understanding of the day-to-day operational needs of working waterfront uses. Addressing these problems would significantly enhance the economic, commercial, recreational, and cultural values associated with the Sound's working coast uses.

Solutions can be developed. Comprehensive harbor management planning can ensure the orderly growth of working coast uses in maritime centers and reduce surface water conflicts among uses. Appropriate zoning can address issues of competition for space. Public sector investments are necessary in maritime centers to improve infrastructure to better support existing investment and to foster private sector investment in developing new, water-dependent commercial and industrial uses. Solutions to the region's dredge spoil disposal problem must be found to ensure safe, cost-effective navigation to and from the Sound's many harbors and ports. Marketing assistance is necessary to better inform the public that many products on which people rely for sustenance come from the Sound's waters and farmlands and that better management of these resources is essential to sustain bountiful harvests.

An overview of the working coast in each county of the Sound region is provided below. This is followed by an analysis of each working coast use, including a description of trends, its significance or value, and associated issues. A final section discusses dredging projects and issues. Recommendations to address the specific needs of the Sound's working coast are provided in volume 1 of the Long Island Sound Coastal Management Program.

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LONG ISLAND SOUND'S MARITIME BASE

WESTCHESTER COUNTY

Concentrations of working coast uses are located in Port Chester Harbor, Mamaroneck Harbor, Echo Bay, and New Rochelle Harbor. Fewer working coast uses are located in Milton Harbor, Larchmont Harbor, and the upper reach of the Hutchinson River.

With the exception of the Hutchinson River, the predominant use in each water body is marinas or yacht clubs. The Westchester County shoreline of Long Island Sound is a major yachting center in the United States. Many large racing yachts make their home port in this area of the Sound, as do thousands of other large yachts and power boats, mid-size boats, and smaller vessels. The 37 marinas/yacht clubs and boat yards along the Westchester coast are concentrated in: New Rochelle and Echo Bay with 14, Mamaroneck Harbor with 12, Port Chester with 5, Milton Harbor with 4, and Larchmont Harbor with 2. Several lobster boats and pot or crate storage areas are also located in Port Chester and Echo Bay.

There are two harbors where water-dependent industrial uses exist. One is Port Chester Harbor where petroleum and aggregates are unloaded. The other is the upper reach of the Hutchinson River where petroleum, aggregates, and scrap metal are shipped. Port Chester and Hutchinson River are major aggregate transshipment points. In 1989, these two ports received a combined total of 45 percent of the total volume of aggregates imported to Long Island Sound harbors (see table 19). In the same year, the petroleum unloading and storage facilities located in the Hutchinson River received 17 percent of the total volume of petroleum products imported to Long Island Sound harbors. Port Chester, by contrast, received only 1 percent of the total volume of petroleum products imported to Long Island Sound harbors in 1989.

Federal dredging projects are authorized primarily to establish and maintain navigation channels or basins in Port Chester Harbor, Hutchinson River, Milton Harbor, Mamaroneck Harbor, Larchmont Harbor, Echo Bay, and New Rochelle Harbor to ensure waterborne commerce. Most dredging today is undertaken to serve the thousands of recreational boats, including large sailboats, which require navigable channels and harbors to operate. No agricultural business exists in this region of the Sound.

NEW YORK CITY

There are 21 marinas and yacht clubs and two boat yards in this section of the Sound coast. City Island is the center of marine activity with 14 marinas/yacht clubs, 2 boat yards, and numerous recreational boating-related businesses. City Island also serves as a port for many lobster vessels and party and charter sport fishing vessels. Just west of City Island, along the shoreline of Eastchester Bay, there are six marinas and yacht clubs. In Little Neck Bay there is one marina. Hundreds of boats are moored offshore in the general anchorage areas of Eastchester Bay and Little Neck Bay. There are two marinas and one yacht club immediately west of the Throgs Neck Bridge, just outside of the Long Island Sound coastal area boundary.

Only one federal dredging project has been authorized in this region, for the Hutchinson River, to create and maintain a navigation channel for waterborne commerce in the upper reach of the Hutchinson River in Westchester County.

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NASSAU COUNTY

Concentrations of working coast uses are located in Port Washington, Glen Cove Creek, and Oyster Bay. Additional working coast uses are dispersed along the west shoreline of Manhasset Bay, the east and west shoreline of Hempstead Harbor, and Mill Neck Bay. Marinas, yacht clubs, and boat yards are the predominate uses in each waterbody. There are 23 marinas/yacht clubs and 9 boat yards. Refer to table 16. Port Washington is the center of marine activity with 19 marinas/yacht clubs and 5 boat yards. Other harbor areas where marinas/yacht clubs and boat yards are located, in descending order of numbers, include: Hempstead Harbor and Glen Cove with nine, Oyster Bay with seven, and Little Neck Bay with two. Port Washington and Glen Cove contain some lobster boats. Port Washington also contains a concentration of party/charter boats, and numerous recreational boating-related businesses. Commercial baymens' boats and facilities are concentrated in Oyster Bay.

Transshipment locations for both aggregates and petroleum are located in Hempstead Harbor, Glen Cove Creek, and Oyster Bay. Manhasset Bay is also used as a transshipment point for petroleum, but not for aggregates. Hempstead Harbor is a major transshipment point in Nassau County and the Long Island Sound region for aggregates and petroleum products. Exports of sand and gravel from Hempstead Harbor ceased in 1988 when the Port Washington sand and gravel mine closed. No north shore port currently exports sand and gravel.

In 1989, Nassau County (led by Hempstead Harbor) received 35 percent of the total volume of aggregates imported to Long Island Sound harbors. During the same year, Nassau County (led again by Hempstead Harbor) received 19 percent of the total volume of petroleum products imported to Long Island Sound harbors. Federal dredging projects have been undertaken or been proposed primarily to create or maintain navigation channels in Little Neck Bay, Manhasset Bay, Hempstead Harbor, and Glen Cove Creek to ensure waterborne commerce or recreational boating activity. No agricultural land exists in the coastal area of this portion of the Sound.

SUFFOLK COUNTY

Concentrations of working coast uses are located in Huntington Harbor, Northport Harbor, Stony Brook Harbor, Port Jefferson, Mount Sinai, and Mattituck Inlet. A few working coast uses are also located in Cold Spring Harbor, Northport Bay, Nissequogue River, and Fishers Island. As in the other counties, the predominant uses in each water body are marinas, yacht clubs, and boat yards. Harbors with the largest concentrations of marinas, yacht clubs, and boat yards, in descending order of numbers, are: Huntington Harbor with 12, Northport Harbor with 7, and Port Jefferson Harbor and Mattituck Inlet with 5 each. Harbors with fewer than 5 marinas/yacht clubs and boat yards are Stony Brook Harbor, Cold Spring Harbor, Mount Sinai Harbor, Nissequogue River, Fishers Island, Centerport Harbor, and Setauket Harbor.

Over 140 full- and part-time commercial fishing vessels are based in ports in Suffolk County. Vessel types include: trawlers, lobster boats, shellfish dredges, and numerous small baymens' clam boats. When moored, many of these vessels are concentrated in Huntington Harbor, Northport Harbor, Port Jefferson Harbor, Setauket Harbor, Mount Sinai Harbor, and Mattituck Harbor. Of the estimated 100 party and charter boats operating within the Long Island Sound region, many are located in Huntington, Northport, Port Jefferson, Mount Sinai, and Mattituck. The majority of these recreational fishing vessels are smaller charter boats, usually less than 40 feet long and mostly used on a part-time basis. There are three

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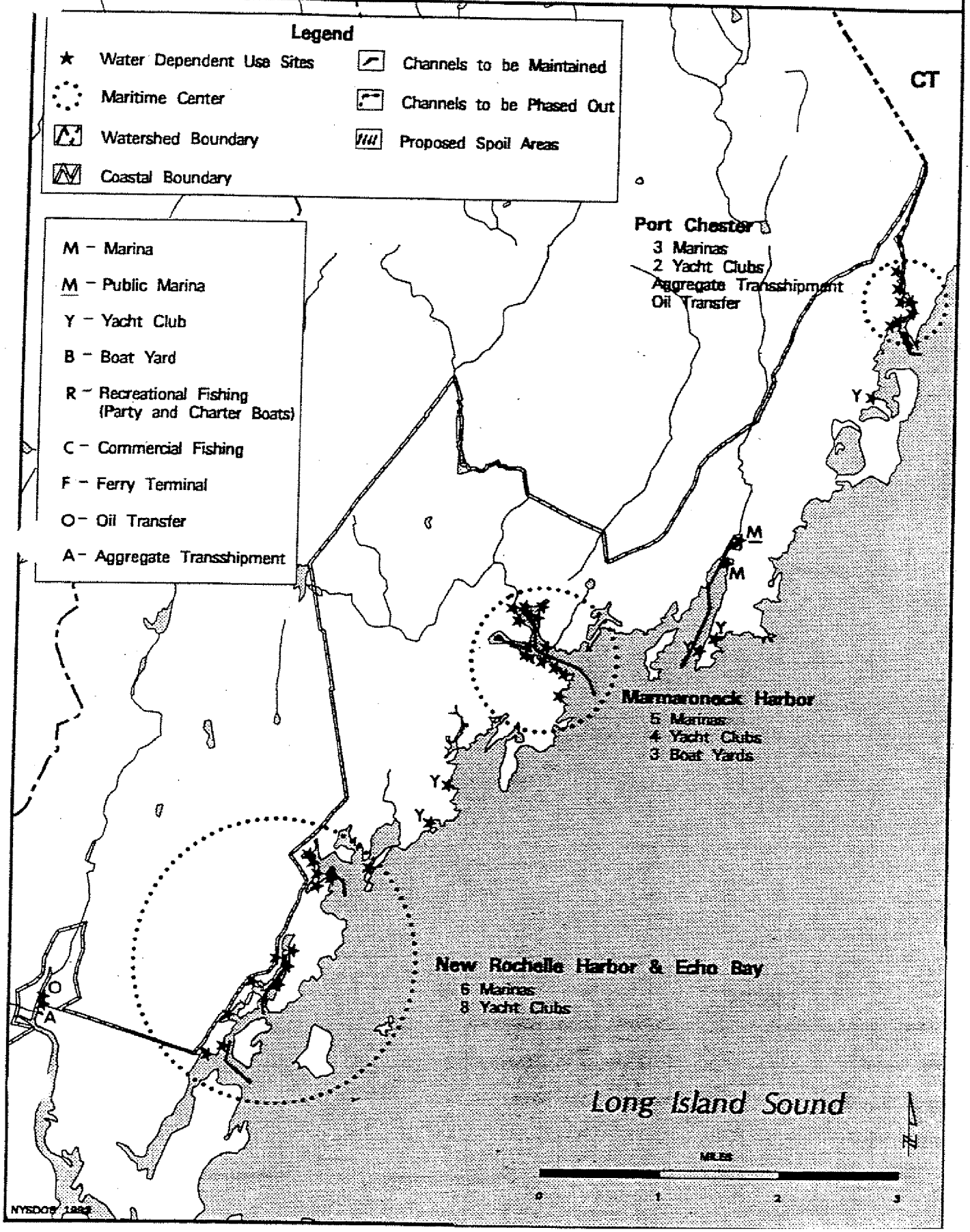
Westchester County
Working Coast

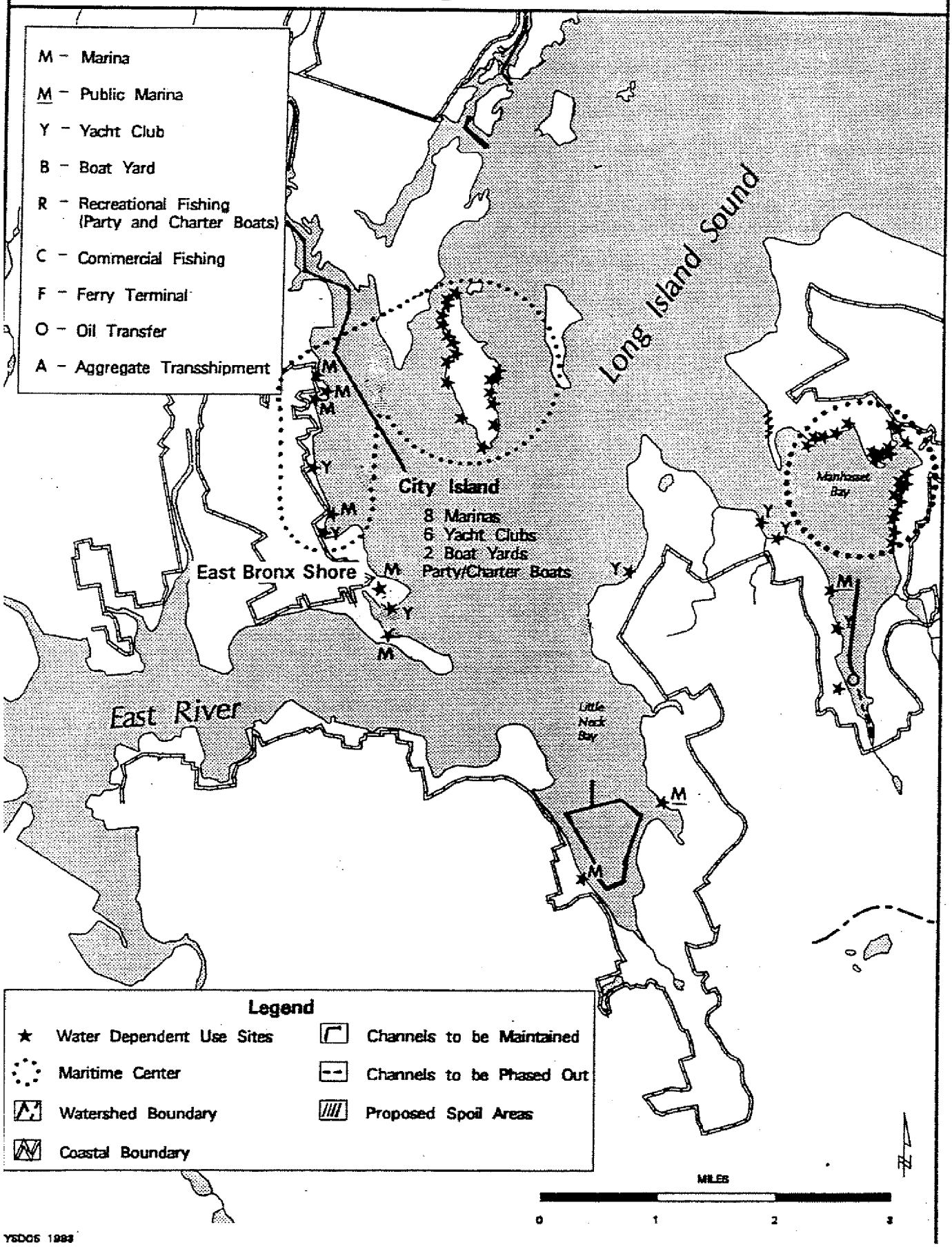
MAP 13.0



BW038143

MAP 13.1

New York City
Working Coast



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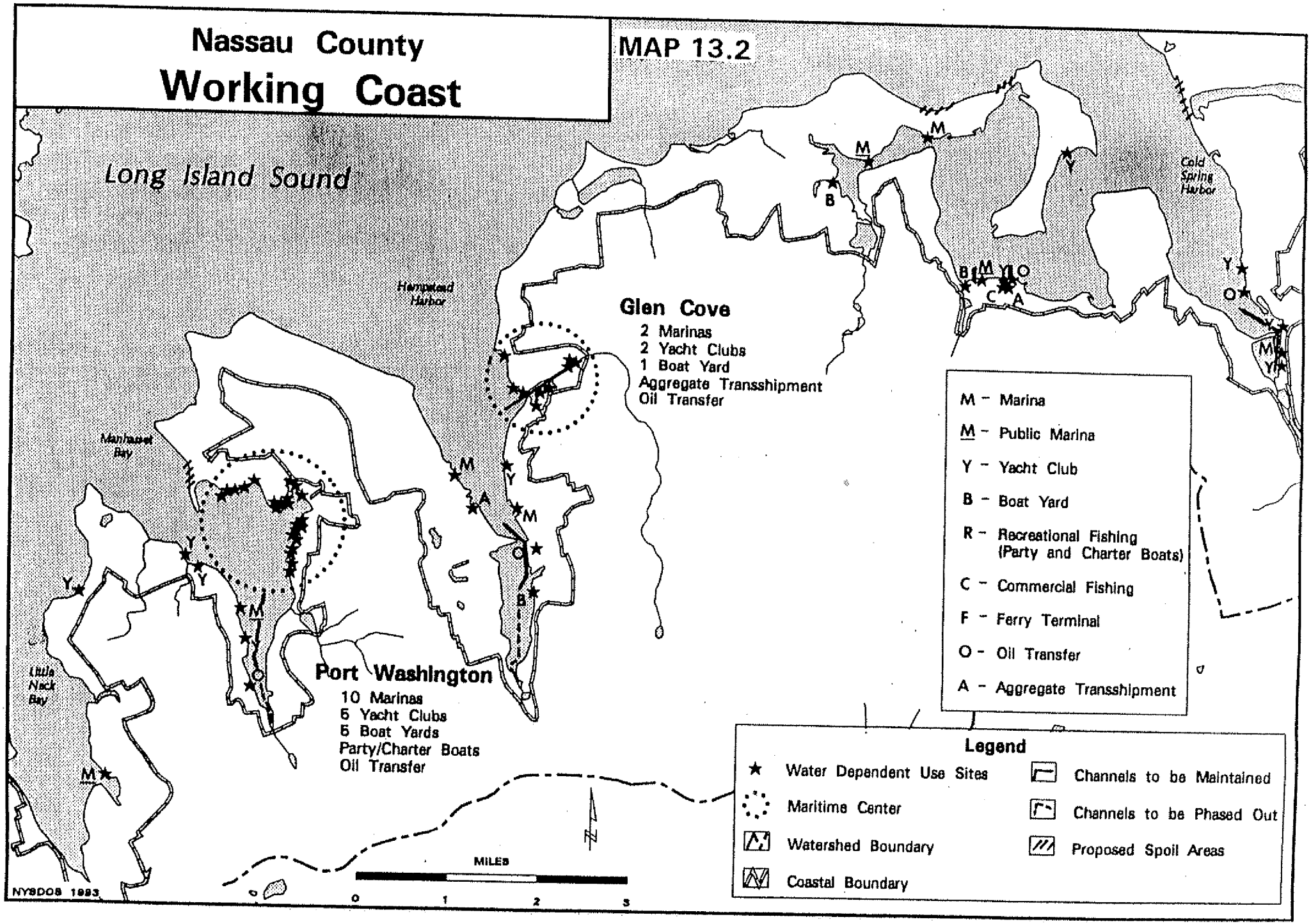
Nassau County
Working Coast
MAP 13.2
Long Island Sound
Hempstead Harbor
Manhasset Bay
Little Neck Bay
Cold Spring Harbor
Glen Cove
2 Marinas
2 Yacht Clubs
1 Boat Yard
Aggregate Transshipment
Oil Transfer
Port Washington
10 Marinas
5 Yacht Clubs
5 Boat Yards
Party/Charter Boats
Oil Transfer
M - Marina
M - Public Marina
Y - Yacht Club
B - Boat Yard
R - Recreational Fishing (Party and Charter Boats)
C - Commercial Fishing
F - Ferry Terminal
O - Oil Transfer
A - Aggregate Transshipment
Legend
Water Dependent Use Sites
Maritime Center
Watershed Boundary
Coastal Boundary
Channels to be Maintained
Channels to be Phased Out
Proposed Spoil Areas
MILES
0 1 2 3
NYSDOS 1993

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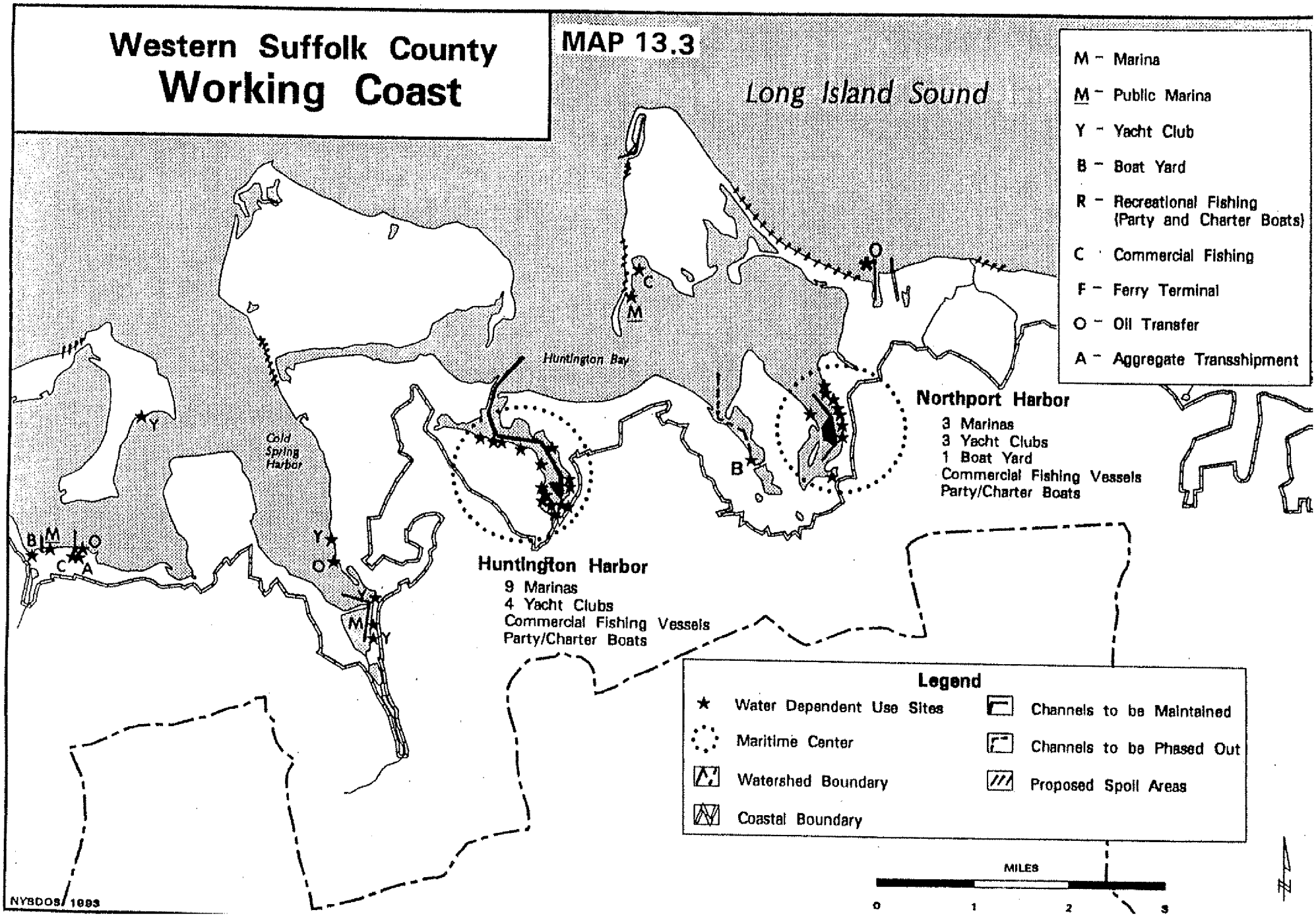
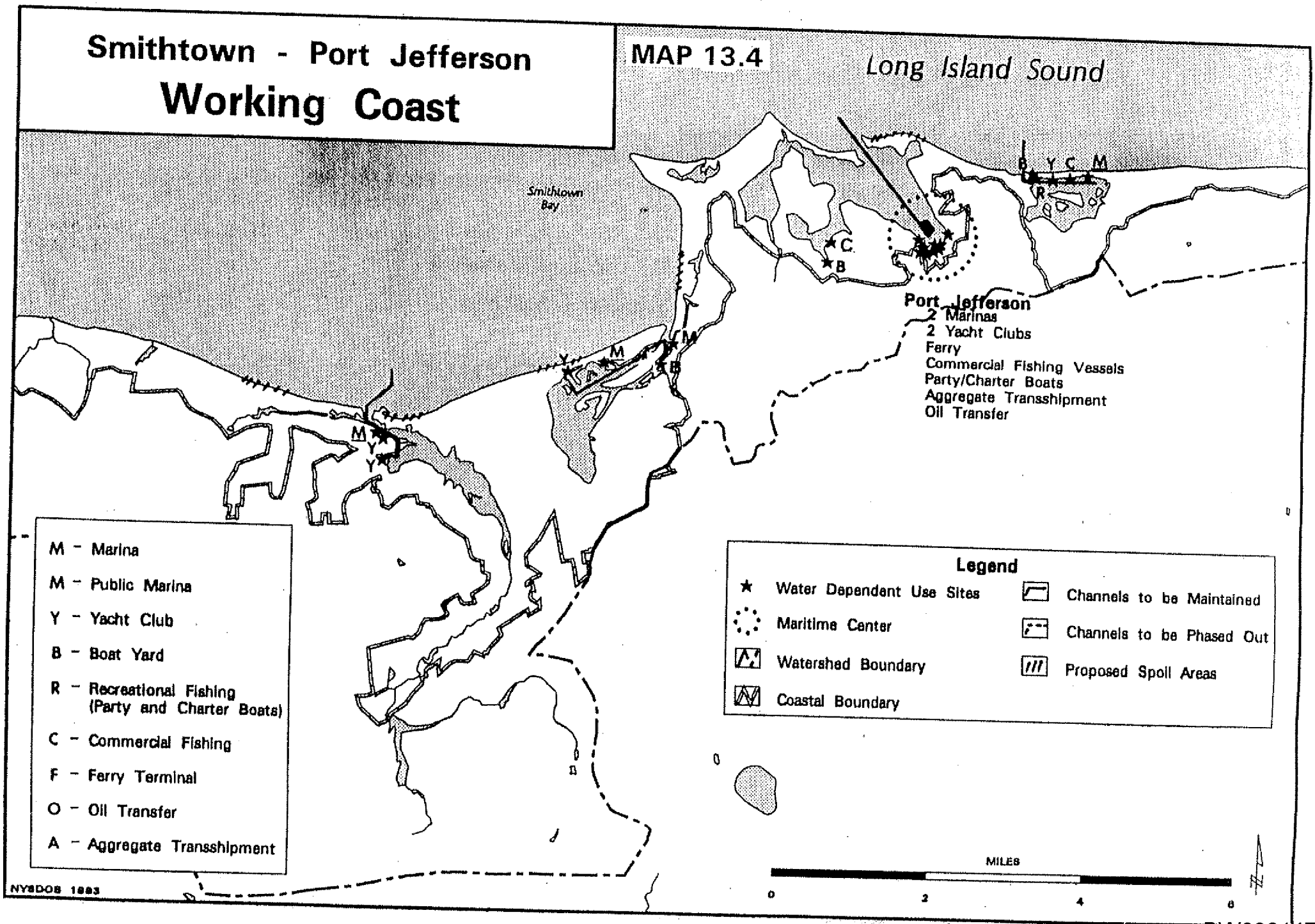
Western Suffolk County Working Coast

MAP 13.3



Smithtown - Port Jefferson
Working Coast



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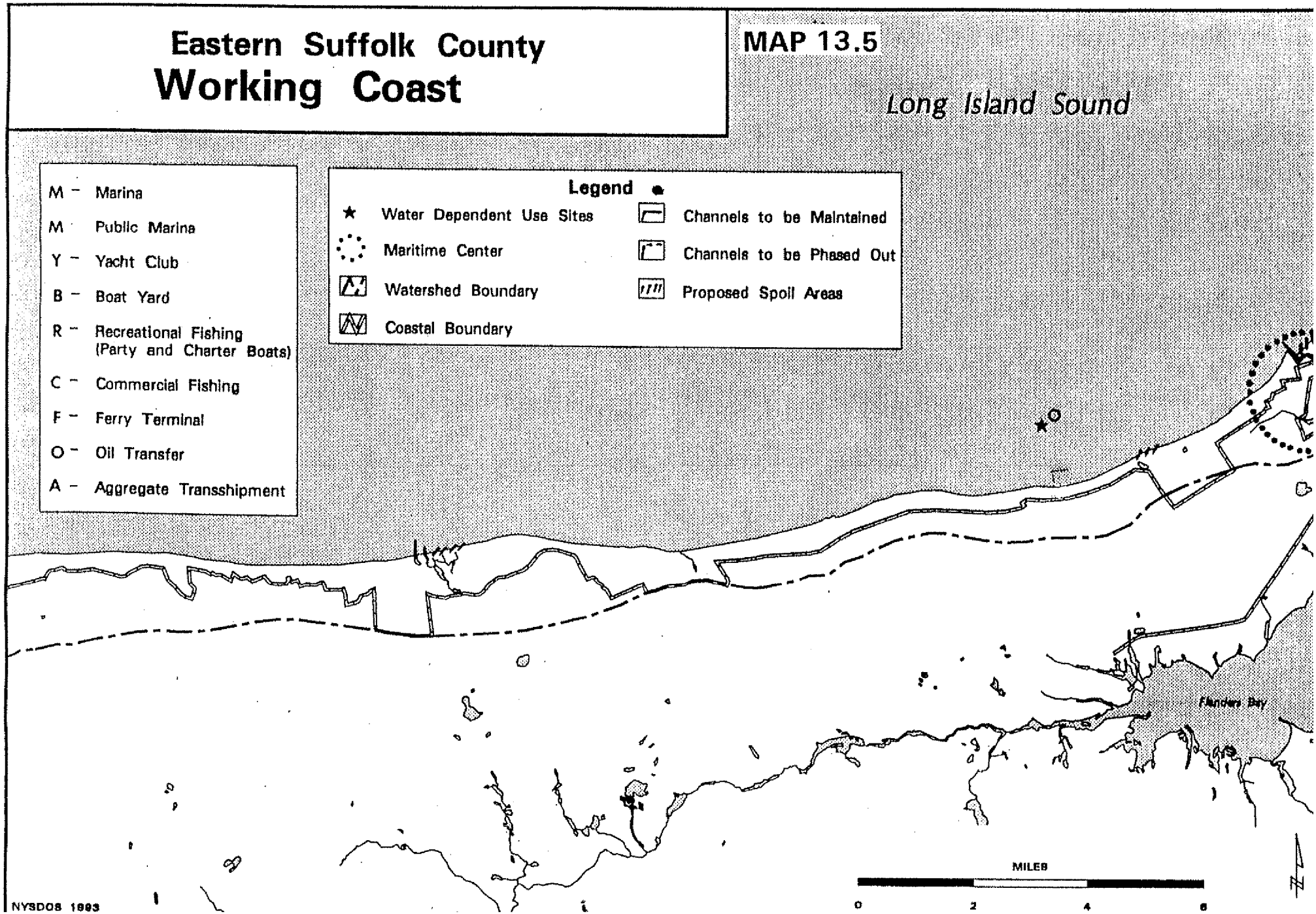
Eastern Suffolk County
Working Coast

MAP 13.5



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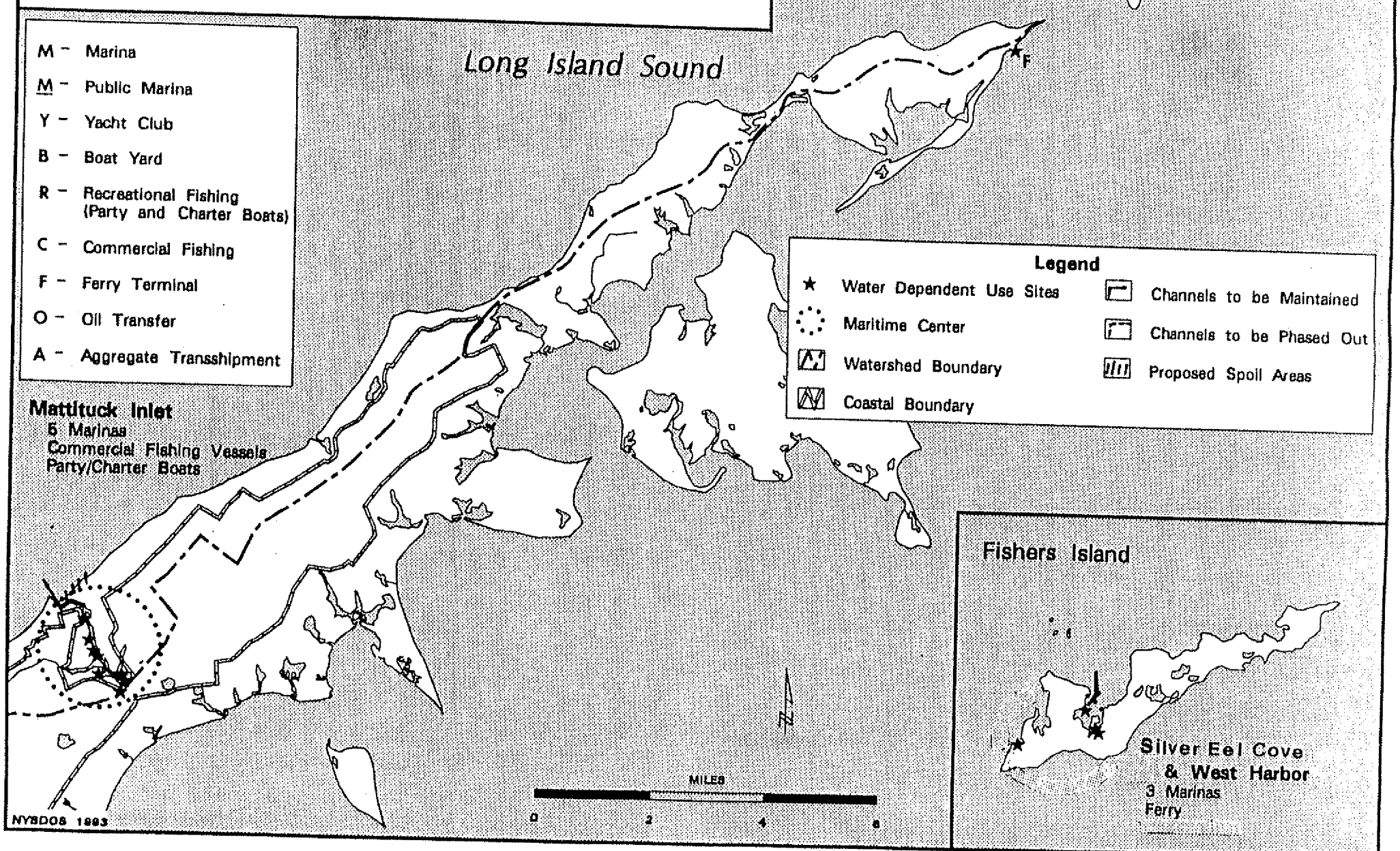
Eastern Suffolk County
Working Coast

MAP 13.6



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ferry services linking the shores of Suffolk County to Connecticut: Bridgeport and Port Jefferson Steamboat Company, operating between Port Jefferson and Bridgeport; Cross Sound Ferry Services, operating between Orient Point and New London; and Fishers Island Ferry Service, operating between Fishers Island and New London.

There are four locations on the north shore in Suffolk County where petroleum products are imported. In 1989, these four locations received 63 percent of the total volume of petroleum products imported to Long Island Sound harbors. The two major locations are Northville and Port Jefferson. The other two locations are Northport Harbor, where imports are used to fuel the Northport power plant, and Silver Eel Pond to serve the energy needs of Fishers Island residents. Petroleum products are brought to Fishers Island by oil trucks that are transported to the island by ferries which dock in Silver Eel Pond. Port Jefferson is also a principal transshipment point for the aggregate imports. In 1989, Port Jefferson imported 20 percent of the total volume of aggregates imported to Long Island Sound harbors.

Federal dredging projects have occurred or been proposed primarily to create or maintain navigation channels in Huntington Harbor, Northport Harbor, Port Jefferson, Mattituck Harbor, and Hay Harbor on Fishers Island. Local government sponsored dredging projects have been authorized to create or maintain navigation channels in Stony Brook Harbor, Nissequogue River, Mount Sinai Harbor, and Wading River. These projects were authorized to ensure adequate channel depths for waterborne commerce, transportation, or recreational boating activity. The vast majority of agricultural lands in the coastal area of the Long Island Sound region are located in eastern Suffolk County in the towns of Riverhead and Southold. Small, isolated pockets of agricultural land exist in the coastal area in western Suffolk County.

WORKING WATERFRONT BUSINESSES

MARINAS AND BOAT YARDS

There are 152 marinas and boat yards in the Long Island Sound region, 37 in Westchester County, 23 in New York City, 42 in Nassau County, and 50 in Suffolk County (see table 16).

The locations of marinas and boat yards are shown on maps 13.0-16.6. The majority of marinas and boat yards, 134, or 88 percent of the total number of these uses on the Long Island Sound shoreline, are located in the bays and harbors of the western half of the Sound. Only 18 marinas, or 12 percent of the Sound's marinas, are located in the eastern portion the Sound from Port Jefferson to Fishers Island. Marinas, yacht clubs, and boat yards represent 75 percent of the working coast uses on the Sound shoreline. Nearly two-thirds of all marinas and boat yards are clustered in ten developed harbor areas, or maritime centers, where water-dependent uses have historically been located. Typically, these are the larger, intensively-used facilities. These developed harbor areas are suitable for marina and boat yard expansions or development of new marinas and boat yards due to physical attributes, such as suitable hydrology and basin depths, protection from storms, proximity to developed areas with upland support services, few natural resource development constraints, and sufficient landside transportation infrastructure and support services.

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Table 16 Long Island Sound Marinas and Boat Yards

	PRIVATE MARINAS	YACHT CLUBS	PUBLIC MARINAS	BOAT YARDS	TOTAL
Westchester County					
Port Chester Harbor	2	2	1	--	5
Milton Harbor	1	2	1	--	4
Mamaroneck Harbor	4	4	1	3	12
Larchmont Harbor	--	2	--	--	2
Echo Bay	3	2	1	--	6
New Rochelle Harbor	2	6	--	--	8
TOTAL	12	18	4	3	37
New York City: Bronx and Queens					
City Island	8	6	--	2	16
Eastchester Bay	4	2	--	--	6
Little Neck Bay	1	--	--	--	1
TOTAL	13	7	0	2	23
Nassau County					
Little Neck Bay	1	1	--	--	2
Manhasset Bay and Port Washington	9	8	2	5	24
Hempstead Harbor and Glen Cove	4	3	--	2	9
Oyster Bay	1	2	2	2	7
TOTAL	15	14	4	9	42
Western Suffolk County					
Cold Spring Harbor	1	3	--	--	4
Northport Harbor	2	3	1	1	7
Centerport Harbor	1	--	--	--	1
Huntington Harbor	7	4	2	--	12
Stony Brook Harbor	--	2	1	1	4
Nissequogue River	--	2	1	--	3
TOTAL	11	14	7	3	32
Eastern Suffolk County					
Port Jefferson Harbor	1	2	1	1	5
Setauket Harbor	--	--	1	--	1
Mount Sinai Harbor	1	1	1	1	4
Mattituck Inlet	4	--	1	--	5
Fishers Island	2	1	--	--	3
TOTAL	8	4	4	2	18
GRAND TOTAL	59	58	19	19	152

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Marinas

All marinas, which are either publicly or privately owned or operated, provide dockside slips or offshore moorings for vessels, allowing people to use and enjoy coastal waters. Types of marinas include: marinas that provide slip spaces and a wide range of related or support services, marinas that provide slip space or mooring services only, and yacht clubs. Yacht clubs are distinguished from marinas because yacht clubs are non-profit membership organizations, whereas marinas are profit-making businesses. The functional characteristics, maintenance and operating needs, problems, and environmental effects of marinas and yacht clubs are the same.

Many marinas provide all of the services necessary for operating, storing, and maintaining vessels and often provide the specialized services once offered almost exclusively by boat yards, such as engine, hull and deck, and equipment repairs. Maintenance or repair services are provided by marina employees or independent contractors who bring their equipment to the site.

Marina support services include a wide range of activities: boat repair and maintenance, boat storage, boat launch and haul out, vessel winterization, boat sales, fuel, pumpout facilities, sail making and repair, and other related support services. These activities may be part of the marina operation, a separate business operating with the marina, or an independent business either in proximity to or removed from a marina or waterfront site. Although these activities are not all water-dependent, support services and marinas complement and strengthen each other.

Boat Yards

The few boat yards in the region that are not also marinas provide: specialized vessel support services, such as vessel construction; commercial vessel and large cruising vessel repair and maintenance; general engine and hull repair; equipment rigging; and launch services to and from offshore moorings. The more successful boat yards have diversified and provide service to all types and sizes of vessels.

Boat yards can be located on the water or inland. At a shorefront location, a boat yard is likely to have some permanent or transient slips. Boat yards servicing large vessels that are difficult to transport on land, such as cruising yachts, commercial fishing vessels, or tugboats, require waterfront locations, because it is impractical and sometimes impossible to transport large vessels inland for repairs, maintenance, or service. Boat yards servicing large vessels require substantial upland space for rails, travel lifts, indoor storage or work areas, and upland storage of vessels.

There are only two boat yards in New York on Long Island Sound which are capable of servicing very large vessels (150 feet or greater). Jakobson's in Oyster Bay is the only facility specializing in tugboat repairs and the servicing of similar commercial vessels, some as large as 250 feet. Derector's in Mamaroneck Harbor is devoted primarily to building, repairing, and servicing very large luxury vessels over 75 feet in length but has taken on a few commercial vessel contracts in response to a decline in luxury vessel contracts due to an economic downturn in that industry. Large vessels require boat yards such as Jakobson's and Derector's in order to remain operational.

Boat yards that service or maintain small to moderate-sized boats do not require waterfront locations, although such a location provides greater conveniences and does not necessitate

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upland transportation to off-site facilities. Boats, engines, or accessory equipment may also be taken to inland locations for servicing, repairs, or storage. Inland locations have an advantage over waterfront locations in terms of lower land prices and taxes.

Several, important, long-term trends are evident in the marina industry on Long Island Sound, including the conversion of individually or family owned businesses to corporate ownership, the loss of small marinas and boat yards servicing large vessels, and the adoption of new strategies for ensuring continued economic viability.

Conversions to corporate ownership. An increasing number of small, individual, or family-owned and operated marinas and boat yards are converting to corporate-owned and operated businesses. Corporate-owned businesses, often having sources of capital other than that provided solely by a marina or boat yard, are also more successful than small business owners at generating or borrowing the necessary capital for major maintenance, operating, and improvement costs.

Loss of small marinas. Most successful marinas are large and diversified, involved in selling, servicing and storing boats. According to the North Atlantic Water-dependent Use Study prepared for the New York/New England Coastal Zone Task Force and confirmed by marina and boat yard operators during interviews for this program, economies of scale (i.e., costs of operation rise by a lesser proportion than the increase in the size of the facility) appear to be associated with marina operations. Small marinas (marinas with approximately 100 or fewer slips) usually do not provide diversified services, do not have a wide profit margin, and do not have enough equity to secure the capital necessary to provide ordinary maintenance, comply with permit requirements or regulations, or provide the competitive services or amenities of larger marinas. Although the demand for slip space is high throughout the region, small marinas cannot raise enough capital to take advantage of this demand, so they are less able to compete with larger facilities. Even where there is adequate capital, inadequate upland space for parking, support services, or other amenities often limit opportunities for expansion. The result is that over the past 20 years, particularly during the fast-paced construction period of the mid-1980s, many small marinas have either been converted to other uses, such as residential condominiums, merged with an adjacent marina to create a larger marina, or become part of a chain of marinas owned by a single entity.

Loss of boat yards servicing large vessels. Only two boat yards exist on Long Island Sound in New York that are capable of providing the services needed by large luxury and commercial vessels. Jakobson's Boat Yard in Oyster Bay may soon be discontinued and sold to the Town of Oyster Bay for a waterfront park, leaving Derector's in Mamaroneck Harbor as the only facility capable of servicing very large vessels on Long Island Sound in New York. Derector's is geared toward servicing luxury vessels rather than commercial working vessels such as tugboats. This single yard is not likely to meet the needs of the region for both large luxury and commercial vessels. As a result, operators of these vessels may be forced to seek services at inconvenient locations and at greater expense, outside the Sound region or the state resulting in an economic loss to the state.

Diversification of services. Development of convenient, one stop boating centers offering a wide variety of services is an important trend. In successful marinas, over 50 percent of gross revenues can be attributed to support services: boat sales and brokerage, boat and engine maintenance and repair, boat accessory equipment sales, pumpout facilities, boat storage, limited retail items, and amenities, such as pools, tennis courts, restaurants, and rest rooms with showers. These types of services give boating centers a competitive edge over

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other marinas. Services which are considered absolutely essential to survival, in addition to boat slip rental, are boat storage, boat sales, and maintenance and repair services.

Reliance on alternative revenue sources. Interviews conducted with marina owners and the North Atlantic Water-Dependent Use Study prepared for the New York/New England Coastal Zone Task Force confirm that many marinas require substantial revenues generated from services other than moorings for economic survival. Marinas are seasonal and simply do not generate enough capital from slip or mooring fees to cover costs for facility maintenance, payroll and benefits, taxes, insurance, and annual operating expenses. The average profit margin from slip rentals represents approximately one percent of a marina's total investment. Of particular financial concern are the large capital investments in such activities as dredging and the repair of docks, piles, and bulkheads which are necessary simply to maintain a facility and retain customers. High operating costs, combined with a relatively short boating season, require additional revenue sources.

Boat yards, like marinas, often require some sort of mixed use or temporary off-season use which can take advantage of a boat yard's equipment (such as automobile engine repair) to subsidize their vessel repair operations and seasonal boat yard income. Some boat yards have added boat slips, moorings, or restaurants to their operations. The additional revenues generated by these accessory uses can improve the economic viability of the boat yard and prevent total conversion to non-water-dependent uses.

Redesign of facilities. The recent economic recession has reduced the demand for large vessel slips while increasing the demand for smaller vessel slips. Marinas have responded to this demand by redesigning existing dock layouts and open water mooring grids to accommodate more smaller boats. The ability to adapt to these demands and conditions allows marina owners and operators to increase the volume of customers and generate needed capital.

Significance to the Region

Recreational boating, which relies on marinas and boat yards, generated in excess of $1.4 billion estimated value in 1990 according to a study prepared for the Long Island Sound National Estuary Program. This is higher than the 1990 recreational use values estimated for sport fishing ($429 million) and swimming ($381 million) combined, and is the highest economic use value on the Sound. These estimated values, which include the use value plus economic impacts or multiplier effects resulting from the use, represent the values for the New York portion of the Long Island Sound.

As a major industry, marinas and boat yards benefit communities and the region in many ways. Marinas generate tax revenues and provide jobs while placing only a modest demand on municipal infrastructure and services. Marina patrons boost local economies with their expenditures for food, lodging, boat equipment and supplies, fishing gear, and transportation.

Marinas and boat yards meet important needs in the Long Island Sound region. They respond to the strong demand in the region for recreational boating and services. Marina and boat yard customers include local boaters as well as transient boaters who use marinas, boat yards, and other nearby services during short-term stopovers between locations within and outside the region.

Marinas help support leisure activities associated with and dependent upon coastal resources. In a region where public access opportunities are inadequate, marinas provide a type of

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access to coastal waters and areas otherwise inaccessible to the public. In addition to public access, marinas often provide other public amenities, such as: boat launching ramps, fishing piers, waterfront walkways, fishing supplies, snack bars and restaurants, picnic areas, transient slips and moorings, restrooms, and marine sanitation pumpout facilities.

Viable and active water-dependent uses, such as marinas and boat yards, deter the conversion of limited commercial waterfront space to non-water-dependent uses. This helps to ensure not only the wise use of limited waterfront space, but also a retrievable commitment of scarce commercial waterfront land if future economic circumstances or public needs require the reuse of the land for other water-dependent uses.

Marinas and boat yards can also provide visually appealing landscapes, unique only to the shoreline, that maintain the nautical character and maritime heritage of many Long Island Sound communities and the region.

Issues

Limited Growth Potential

Growth opportunities or expansions for new marinas and boat yards appear to be limited to areas where concentrations of water-dependent uses, or maritime centers, exist. There is some potential to expand existing facilities or to site new facilities in maritime centers where there are few natural resource or development constraints and where the necessary landside infrastructure and support services exist. These areas will need to be protected for these water-dependent uses. High start-up costs for land acquisition and construction and for obtaining the necessary regulatory approvals, which can be a protracted and expensive process, further constrain development of new facilities or expansions.

One option for improving the growth potential of marinas is through greater use of dry rack upland storage. Dry rack requires little in-water or linear shoreline space and offers an opportunity to expand and efficiently utilize upland space. Additional benefits include: reduced maintenance costs for damaged in-water facilities, less need for extensive dredging to enlarge basins, and fewer adverse effects associated with in-water marina and boat yard activities.

Dry rack does not appear to be popular in the New York portion of Long Island Sound due to a variety of both real and perceived problems, such as community opposition, visual impacts, vessel damage liability when transferring vessels, possible damage from fires or other hazards while stored on racks with other vessels, and customer demand for in-water storage. Nevertheless, the opportunity to use dry rack storage as a means of expanding the industry, while preserving sensitive areas, should not be dismissed. Successful dry rack facilities could serve as a promotional example for expanding the customer base and number of people served by marinas and boat yards and could also be used to demonstrate how cumulative and secondary impacts of new or expanded marinas and boat yards can be minimized.

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The Need for Increased Predictability

A variety of circumstances, an unpredictable regulatory environment and high land, construction, and dredging costs, makes some investors reluctant to invest in marina expansion or development. Obtaining permit approvals in the highly unpredictable and usually protracted regulatory process adds significant cost and uncertainty to project development. Costs to obtain permits, combined with site development and operating costs such as maintenance, taxes, and insurance, make it difficult to demonstrate to lenders that there will be a positive return. There is often a lack of certainty about project approvals because local planning and zoning documents do not provide clear guidance on acceptable locations and development standards.

Inadequate Land and Water Use Controls

No marina, no matter how successful, is immune to the lure of high profits from conversion to non-water-dependent uses. There is a constant pressure and threat to replace marinas with non-water-dependent uses, primarily residences and restaurants, in many areas throughout the Sound. The short-term incentive for marina and boat yard owners to convert or sell waterfront land for these non-water-dependent uses is high, but the long-term economic value of the land for water-dependent use, such as marinas and boat yards, is higher.

Marinas can and do make profits, and there is a need to retain them since they are important uses on the coast. Some municipalities, through their Local Waterfront Revitalization Programs, have enacted land use regulations to protect and promote marina and marina support facilities in harbor areas having sufficient basin depth, upland support, and associated facilities adjacent to or near the waterfront. Approach channels and public anchorage areas in harbor areas enhance the ability of these uses to exist. Harbor management plans being developed by some communities have begun to address surface water use conflicts by establishing water use guidelines and regulations.

Less than five percent of the Long Island Sound shoreline in New York is occupied by marinas and boat yards. Although some communities, such as the Village of Mamaroneck, protect marinas and boat yards through land use regulations, only a fraction of the water-dependent uses on the Sound are protected by or given preference over non-water-dependent uses in zoning laws. In the Town of Huntington, which has adopted a harbor use district for one of the most intensely used harbors on the Sound, some non-water-dependent uses are allowed directly on the waterfront in an area that is clearly appropriate only for water-dependent uses. There is a need to protect, promote, and give preference to these uses, particularly within the harbors where they are concentrated.

Complex Permit Process

There is a need for regulatory simplification whether the project is to complete minor modifications to an existing marina, expand an existing marina, or construct a new marina. The increasingly complex, lengthy, and unpredictable regulatory process, involving all levels of government, has become a major impediment and financial burden for marinas and boat yards.

Different agencies with different legislative "missions" and discrete or narrow regulatory concerns apply different standards; as a result, comprehensive and consistent regulatory standards are lacking. Project review requirements differ from agency to agency and can even differ among project review staff within the same agency. Many marina and boat yard operators report that complying with an unpredictable regulatory maze increases overhead costs for legal and technical services and that these costs could be better spent on

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maintenance and other operating costs. In the view of many operators, project review results in nothing more than delay, adds costs to a marina or boat yard project, and breeds disdain for the regulatory process.

Existing marina operators are adversely affected by long project approval times. They are, for instance, not able to advise potential customers of future slip availability and cannot respond rapidly to changing market conditions. Because the existing regulatory process is so rigid, it is extremely difficult to accomplish relatively simple, small-scale maintenance, site layout modifications, or expansions, such as dock reconfiguration and dredging, within a relatively short boating season. If minor modifications involving the location of docks and piles are completed without a permit, or are not precisely in accord with an issued permit, the operator or owner may receive a large fine and be ordered to remove the modification, even though it may eventually be allowed after the regulatory process is completed.

Dredging is often required to navigate in areas where other upland activities have caused channels and basins to fill in or shoal. Although some pollutants in basin sediments come directly from marinas and boat yards, many other pollutants originate from upland sources. These pollutants cross marina or boat yard sites in sheet runoff, through culverts, or along roadways before entering the water column and basin sediments. In some cases, dredging and disposing of this sediment have become prohibitively expensive because of the costs associated with toxics analysis (required as part of the dredging project review) and with transporting, disposing, and capping contaminated spoil.

Unsupportive Zoning and Unfair Tax Assessments

Marinas are often assessed as non-water-dependent uses, such as residential uses, even where such uses are prohibited by local zoning laws. The result is a higher tax assessment, which reduces the profitability of the marina and becomes a disincentive for remaining as a water-dependent use.

This is the case in the Village of Mamaroneck, where portions of the waterfront are zoned exclusively for marine commercial uses, but are taxed for residential use. However, the village is in the process of reassessing water-dependent businesses for their value as water-dependent uses and issuing tax refunds, as appropriate. In the City of Rye, marinas and boat yards are also at a disadvantage. In this case, both marinas/boat yards and residential uses are allowed with all uses being assessed at residential levels.

Appropriate tax assessments, which treat marinas and boat yards as water-dependent uses, can help these uses remain profitable. Waterfront areas developed with water-dependent commercial uses need to be protected for water-dependent uses rather than converted to uses not requiring a waterfront location, since this results in a permanent loss of scarce land for water-dependent uses. The value of existing marinas and boat yards on the Sound is expected to be high over the long term, given the region's affluence, recreational boating demand, and limited growth potential for new marinas. While short-term real estate values for waterfront property may be higher for residential uses, the long-term public value of marinas and boat yards on the shoreline is high and supports the need for protection.

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Competition Between Privately Owned and Publicly Owned Marinas

Public, or municipally owned marinas, which are usually taxpayer supported, can adversely affect demand at privately owned marinas. Municipal marinas can charge as much as two-thirds less than a private marina, since they do not carry comparable overhead costs for taxes, insurance costs, sales tax, interest on loans, and payroll. The marina industry has suggested that if public marinas are permitted, municipalities should demonstrate that the fees from public marinas are adequate to cover the operating costs. This would demonstrate to municipal taxpayers that the entire municipality is not subsidizing a non-essential facility that the private sector could provide.

On the other hand, public marinas provide a type of boating access to a segment of the general public that would not otherwise be able to afford the fees charged by private marinas. Municipal marinas on Long Island Sound, however, often reserve a resident's interest in a slip for the life of the resident or as long as the resident owns a vessel. Waiting periods for slips at municipal marinas can be over ten years, so that many residents who can afford the municipal marina, but not a private marina, are left without a slip.

Various solutions to these issues have been explored. However, given the competing interests of public versus private marinas, and the complexity of the issues, a solution to this problem is not readily apparent.

Impacts of Large Dock Facilities Associated With A Non-Commercial Use

With increasing frequency, requests are being made to construct large dock facilities, having the capacity to accommodate from 4 to 40 boats and associated with a non-commercial upland use. Often the upland use is residential, usually high density condominiums, townhouses, or apartments, and is in a location that is entirely unsuitable for a large, commercial dock facility. The dock facility is likely to adversely affect the residential character of the development and the shoreline, as well as public trust lands and waters, natural resources, and aesthetics, in the same way an inappropriately sited marina would.

COMMERCIAL FISHING

An integral part of Long Island Sound history and the economy for over 300 years, commercial fishing continues today using both state-of-the-art equipment and traditional harvesting methods. Over 45 species of finfish, crustaceans, and shellfish are caught in Long Island Sound. Offshore fishing in deeper bay water and in the Sound itself centers on species such as lobsters, surf clams, butterfish, Atlantic mackerel, herring, flounders, squid, and porgy. This commercial fishing activity is centered in six locations: the west end of the Sound, Huntington Harbor, Northport Harbor, Port Jefferson and Setauket Harbors, Mount Sinai Harbor, and Mattituck Harbor. (These fishing centers are described in more detail below.).

The inshore harbors and bays on Long Island Sound produce some of New York's most productive fisheries and shellfisheries. Commercial harvesters who work these inshore areas are independent baymen or lobstermen and represent the largest segment of the commercial fishing industry in New York. Baymen use traditional hand harvesting methods, such as raking for hard clams, digging for soft clams, tonging for oysters, and combing for eels. Lobstermen set pots for lobsters and conch. In the Huntington Bay complex, there has been a return to the use of the traditional clam boat powered by sail to dredge for oysters in waters that are too deep for hand tonging.

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Commercial Harvesters and Volume of Harvest

There are nearly 146 full- and part-time commercial trap and trawl fishing vessels based in Long Island Sound harbors: approximately 20 trawlers or draggers which tow nets through the water to catch species like flounder and cod; 122 lobster boats which carry lobster traps or pots to locations in the Sound; and 4 shellfish dredges which harvest clams and other shellfish from the Sound bottom. In addition, several hundred inshore commercial bay boats, called garvies or sharpies, are moored or trailered to most harbors and bays. Baymen ply inshore harbor and bay areas in these small, shallow-draft vessels which are used as work platforms, culling stations, and a means for transporting the harvest back to shore.
In 1991, New York's total harvest from Long Island Sound was 16,567,563 million pounds of fish and seafood with a dockside value at $21,244,262. This represented 33 percent of the total volume of fish harvested in New York State and 40 percent of the total value. It is important to note that the dockside value does not represent the total use value which includes, in addition to dockside value, the economic impacts or multiplier effects resulting from commercial fishing activity in the New York portion of the Sound. If computed, the total use value in 1991 for commercial fishing activity would represent a value equivalent to approximately three times the dockside value or close to 63 million dollars.

The overall volume of commercial fishing landings in Long Island Sound increased by approximately 50 percent from 1987 to 1991. Table 17 shows the total landings for the Sound from 1987 to 1992. These figures are derived from two special statistical runs made by the National Marine Fisheries Service in August, 1991 and March, 1993. The 1992 data is classified as preliminary. In contrast to the harvest volume from 1987 to 1991, the overall harvest value remained relatively flat (a decrease of $0.58 in the average price per pound). The decrease in value can be attributed to a shift in harvest effort from high-value finfish and shellfish to underutilized and non-traditional species, such as squid, Atlantic mackerel, and herring which do not command high prices per pound domestically. The greater volume may have resulted from increased fishing activity and different harvesting techniques.

The data depicted in table 17 demonstrates the economic importance of three species in particular: American lobster, hard clams, and surf clams. In 1991, these three species accounted for 80 percent of the total value and 67 percent of the total volume of landings made by Long Island Sound commercial harvesters. From 1987 through 1991, American lobster and hard clam harvest values made up an average of 70 percent of the total value of the New York Long Island Sound commercial harvest. The lobster harvest increased in volume by over 50 percent though its price per pound decreased. In these same years surf clam landings averaged 47 percent of the total catch from the Sound, representing a 1,040 percent increase in volume from 1987 to 1991. The hard clam harvest, however, remained flat.

Historically, New York's hard clam fishery was one of the most productive in the United States. Hard clams favor certain conditions which prevail in the waters of Long Island Sound, i.e., shallow, brackish water and sandy bottom areas. However, between 1976 and 1987 the industry declined rapidly due to overfishing, loss of habitat, and water pollution. In recent years additional areas have been closed to shellfishing as a result of water pollution and the presence of large numbers of boats. Currently, all waters off New York City and Westchester County are closed or conditionally closed to the taking of shellfish. The decrease in harvest areas has resulted in the decrease of shellfish harvesting activity, as evidenced by a decrease in issued shellfish licenses.

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Table 17 Shellfish and Lobster Landings as Percentage of Long Island Sound Total Landings

	AMERICAN LOBSTER	HARD CLAMS	SURF CLAMS	TOTAL LIS LANDINGS
1987				
Pounds	849,900	1,157,700	692,300	8,360,600
% of Total	10%	24%	8%	100%
Value in $	2,806,748	7,225,079	229,667	15,533,691
% of Total	18%	65%	1.4%	100%
1988				
Pounds	1,347,619	1.157,100	993,900	10,800,619
% of Total	12%	11%	9%	100%
Value in $	4,453,006	7,550,963	397,675	18,533,096
% of Total	24%	41%	2%	100%
1989				
Pounds	1,443,100	1,137,900	3,704,900	9,747,200
% of Total	15%	12%	38%	100%
Value in $	4,793,431	8,337,470	1,367,419	18,540,107
% of Total	26%	45%	7%	100%
1990				
Pounds	1,888,795	1,384,668	8,788,677	15,790,970
% of Total	12%	9%	56%	100%
Value in $	5,951,647	8,688,849	3,076,039	23,810,213
% of Total	25%	36%	13%	100%
1991				
Pounds	1,932,940	1,171,608	7,916,968	16,567,563
% of Total	12%	7%	48%	100%
Value in $	5,665,394	8,798,776	2,421,893	21,244,262
% of Total	27%	42%	11%	100%
1992				
Pounds	1,786,695	1,302,540	3,677,746	11,534,716
% of Total	15%	11%	32%	100%
Value in $	5,784,314	7,634,225	956,214	20,756,001
% of Total	28%	26%	11%	100%

Source: 1987-1989: NMFS 8/26/91 special run, Washington, DC.; 1990-1992: NMFS 3/30/93 special run, Woods Hole, MA.

New York's commercial harvest accounts for more than half the total amount of fish and seafood taken from the Sound. Connecticut and Rhode Island make up the rest of the harvest. Data from 1980 to 1991 indicates that New York has been gaining an increasingly larger share of the catch from Long Island Sound. Connecticut's volume has also been increasing, but not at the same rate as New York's. Despite this, the value of Connecticut's harvest has increased due to that state's oyster production and harvest. Since 1984 Rhode Island's share of the Long Island Sound harvest has been decreasing.

Seafood Packaging and Sales

There are four packing houses on the Sound, all located in Mattituck Inlet. Two of these houses, Long Island Sound Seafood Company and King Seafoods, operate their own boats. The other two, Cook's Dock and Petersen's Dock, are used to pack-out fish and lobsters for transport to local fish markets, regional packing houses, or the Fulton Fish Market.

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The Long Island Sound Seafood Company is the largest of the four houses in Mattituck and one of the oldest on Long Island. The company ships between 75 and 80 percent of its product to the Fulton Market. The remaining product is sold locally. There are two 5,000 square foot warehouses at the facility, including cold storage. King Seafood is a small family-owned business operating in a fashion similar to Long Island Sound Seafood. Frank Flowers and Sons in Oyster Bay, which specializes in shellfish culture, harvests and sells shellfish at wholesale.

Of all the harbors on the Sound, only Huntington has a fish buyer to serve the commercial fleet. Elsewhere, harvesters market their catch locally or have arrangements with wholesalers who transport the harvest to distributors or processors in New York City and sometimes as far north as Canada.

Most baymen sell their products directly to retailers and wholesalers immediately after harvesting, either at the dock or shoreline when the product is transferred to shore or within a few miles of the harvest area. Hard clams, oysters, soft clams, mussels, and lobsters are often sold directly to restaurants or retail food establishments without using wholesalers as middlemen, although many baymen sell to wholesalers when demand from favored retail buyers is reduced. Conch and eel are occasionally sold locally, but usually trucked or shipped to regional seafood centers such as the Fulton Fish Market in New York City. Many baymen have established export contacts for American eels and conch and air freight their product directly to markets where the demand and dollar value of the product are highest.

Inshore Harvesting

The inshore harbor and bay shellfishery consists of hard clams, oysters, soft clams, mussels, and conch. It is harvested primarily by inshore baymen operating from small bay boats and occurs in at least part of all the bays and harbors of Nassau and Suffolk counties. Inshore baymen also harvest lobsters within the harbor and bay complexes and occasionally harvest them from deeper waters in the Long Island Sound basin. Baymen also harvest eels from nearshore areas near the heads of many of the Sound's embayments.

A total of 1,368 commercial shellfishing permits were issued to harvesters residing in towns with frontage on Long Island Sound in 1992. Of these, approximately 412 permits were issued to harvesters from towns with embayments located in Long Island Sound exclusively. Many of the remaining 956 permits were issued to residents of towns with embayments located in Long Island Sound and Long Island's south shore or Peconic Bay. The greatest number of these harvesters most likely harvested shellfish on the south shore in the towns of Oyster Bay and Brookhaven and in the Peconic and Flanders areas in Riverhead and Southold. Some permit holders do not harvest on a full-time basis.

The numbers of permits issued by DEC to residents of towns with frontage on Long Island Sound in 1992 were:

Towns Fronting Long Island Sound Only	
N. Hempstead	12
Huntington	361
Smithtown	39
Total	412

Towns Fronting Long Island Sound and South Shore or Peconics	
Oyster Bay	167
Brookhaven	544
Riverhead	37
Southold	208
Total	956

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Commercial Fishing Harbors

West End of Long Island Sound

Although the west end of Long Island Sound, from west of Huntington Bay to the Connecticut/New York border, is dominated by recreational boating, commercial harvesting also occurs in the Sound and its bays and harbors.
Lobster harvesting accounts for the bulk of the harvest in this section of the Sound. Echo Bay and Hawks Island in New Rochelle, City Island in the Bronx, Whitestone Harbor, Westchester Creek, Manhasset Bay, and a number of smaller tributaries are home ports for lobster boats. A 1989 study prepared for the Department of State, Development of a Commercial Fisheries Industry Strategy for the State of New York (AT Kearney Study), estimated that there were between 30 and 50 resident full-time lobster boats operating in the western Sound and about 100,000 lobster pots. Because of fear of poaching, pots are rarely marked. Most inshore baymen operate within the Oyster Bay complex, and a few work and keep their vessels in the Hempstead Harbor area. The Frank M. Flower Oyster Company cultivates oysters in Oyster Bay Harbor, and is the largest oyster industry in the state.

There are few facilities in the western Sound harbors that cater to the needs of commercial harvesters. Most lobster harvesters do not have access to dock space. Consequently, if they cannot get access to a public dock, they transfer their catch from their moored boats to skiffs for unloading. Those harvesters who do have dock space often pay a premium price. Fueling is also difficult and expensive. Most marinas charge commercial boats the same price for fuel as recreational boats. In some cases fuel is brought by pickup trucks to the docks. There are no commercial ice facilities, so many lobster harvesters have to purchase ice at local delicatessens. Maintenance and repair services are also limited. There are no boat yards or repair facilities (diesel, electronics, and gear) that cater to commercial fishing in this area of the Sound. As a result, if vessels operators or owners need these services, they travel out of the area or pay a premium price for these services from businesses that service recreational boats.

Huntington and Centerport Harbors

Offshore commercial fishing from Huntington Harbor centers almost exclusively on lobster. The harbor is saturated with recreational boats. In 1991 there were seven or eight lobster boats located in Huntington Harbor. Centerport Harbor has two trawlers and 10 or 12 lobster boats. These boats do not work through the winter. Offshore harvesters from this area have established informal proprietary fishing grounds that extend from west of the harbor to Connecticut, ten miles across the Sound. Transient commercial fishing boats rarely use this harbor. Over 100 inshore baymen keep their vessels in Huntington Harbor, and several are kept in Centerport Harbor. The Huntington Bay complex, including Huntington and Centerport Harbors, also supports the largest inshore shellfishery on Long Island's north shore.

Basic services needed by commercial harvesters are limited. If commercial boats need maintenance or repair, including electronic or gear repair, they pay a premium price for these services from marinas or they take their boats to Massachusetts or Rhode Island where commercial harvesters can purchase fuel and ice at a reduced rate.

Unlike boats in the western Sound, commercial fishing boats are allowed to unload and pack fish at Huntington's public dock. However, these boats are not allowed to berth overnight.

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Most of the boats are moored in the harbor; some are tied up at a dock owned by a commercial fisherman.

Northport Harbor

Northport Harbor is located in the eastern section of the Huntington Bay complex. Northport is primarily an offshore lobster port and inshore bay boat port, although several small trawlers and a shellfish dredging fleet are also located there. There are about 20 lobster boats in Northport Harbor. A number of inshore bay boats are also kept in the harbor year round. Most of the lobster fleet works throughout the winter. Like lobster fishermen in other parts of Long Island Sound, the Northport harvesters have established informal territories for lobster harvest. Only one of the trawlers is presently active, making day trips to Long Island Sound.

Facilities and services are somewhat more conducive to commercial fishing needs in Northport. Commercial fishing boats pack out at the village dock, located in the center of the community. The dock was rehabilitated in 1986, but commercial fishing boats cannot use it at low tide. A float dock is used during these periods. The commercial marinas in the harbor supply the commercial fleet with fuel at a reduced cost during certain hours of the day. However, due to the high volume of fuel that a commercial fishing boat holds, the marinas cannot fully supply the boats, and twice weekly fill-ups are necessary. Like the harbors on the western end of the Sound, overnight docking is not available for commercial harvesters. Those lobster boats that fish year-round moor their boats near the Long Island Lighting Company's plant in the winter, because the heated effluent prevents ice formation.

Port Jefferson and Setauket Harbors

The next major concentration of commercial fishing boats is found in Port Jefferson and Setauket harbors, about ten miles east of the Huntington Bay complex. The Village of Port Jefferson lies at the head of Port Jefferson Harbor. This is one of the largest natural deep draft harbors on Long Island. By contrast, Setauket is a shallow harbor, part of a bay complex contiguous to the western portion of Port Jefferson Harbor. Boats from Setauket access Long Island Sound through Port Jefferson Harbor. Setauket has a maritime and fishing tradition going back to the 17th century.

Port Jefferson and Setauket harbors, and Conscience Bay support a substantial hard clam and oyster shellfishery. The offshore harvesters here concentrate most of their efforts on the open waters of the Sound adjacent to the bay. These waters, together with the western part of the Sound, are considered to be some of the best lobster grounds on the East Coast. The AT Kearney Study estimated that an active lobster harvester can pull 350 to 400 pots per day from this area.

Offshore commercial fishing in Port Jefferson and Setauket harbors is conducted mostly by family-owned businesses. There are three trawlers and eight to ten lobster boats working out of the harbors. In Setauket, catches are offloaded onto smaller vessels and rowed ashore for loading onto trucks. Over the past several years the volume of finfish taken has decreased, and with the state prohibition against taking lobsters by trawlers, it is difficult for these boats to sustain operations in the Sound. However, modifications to some of the trawlers have allowed operators to enter into the live fish market.

Commercial harvesters in Port Jefferson have generally better access to dock space than in other harbors. The Town of Brookhaven sets aside six slips at the public dock for commercial fishermen, although no security or services are provided. Catch is unloaded

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from the boats to the parking area, but this has become more difficult since the installation of a public esplanade. No gear storage is available.

Fuel and repair services for commercial fishing boats are available in the harbor. Most vessel owners do their own minor repairs, but diesel repair services and small maintenance services are available locally. For larger boats or annual overhauls, the Port Jefferson fleet generally goes to Connecticut.

The Port Jefferson waterfront has been transformed from a largely commercial and industrial harbor to a recreational harbor that attracts tourists. Due to the changing focus of the harbor, there are increasing conflicts between recreational and commercial users of the harbor.

Mount Sinai Harbor

Mount Sinai Harbor, located three miles east of Port Jefferson, is home port to a highly productive lobster fleet. Although recreational boats are dominant, about 15 active lobster boats and a trawler still operate out of the harbor. These boats fish between 10,000 and 20,000 pots per year. In 1987, they accounted for over one million pounds of lobster. Each commercial lobster harvester from the harbor has staked out its territory, which is guarded against intrusions by newcomers. Generally, the Mount Sinai fleet operates in the area between Shoreham and Crane Neck Point to the west. Several commercial bay boats are moored in the harbor. The harbor supports a small hard clam, soft clam, and oyster harvesting industry.

The harbor is generally too shallow and congested with recreational boats to accommodate fishing boats over 50 feet in length. The largest commercial boats in the harbor are 45-foot lobster boats. All but one of the commercial boats in the harbor are moored, because dock space is lacking. Products are unloaded at the two town floating docks. These docks are also used by recreational boaters, and commercial harvesters often have to wait to use the facilities.

Mattituck Inlet

Mattituck Inlet is the narrowest and shallowest commercial fishing vessel port on Long Island. These physical constraints limit use of the harbor to boats less than 60 feet in length. Shoaling at the mouth of the inlet poses some obstacles to deep draft boats.

The commercial fishing vessels in Mattituck center on 12 to 15 trawlers. While most boats make daily runs, several captains make extended trips. The fleet fishes 150 to 200 days per year, but the small size of the boats prevents winter fishing. There are also between six and ten small lobster boats in the harbor making day trips to Long Island Sound. A couple of lobster boats also fish for conch. Only one inactive surf clam boat remains at Mattituck due to the decrease in surf clams which were once gathered in large numbers from Long Island Sound. The inlet supports a small hard clam, oyster, and soft clam industry. Almost all of the commercial fishing activity in Mattituck is family-owned and operated.

Mattituck provides excellent dock opportunities for commercial fishermen. Over 250 feet of dock space is available. One of these docks has an hydraulic crane to unload fish. Unlike many ports on the Sound, there is some gear storage space available in the harbor. No ice is available, and individual captains have fuel hauled directly to their boats. Haulout and annual maintenance of commercial fishing boats are provided by one firm in the harbor;

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however, shoaling in the haulout area has made it difficult to service large boats. Mechanical and engine repairs are done by on-call mechanics.

Unlike the other ports on the Sound, Mattituck is used by transient vessels from Shinnecock during the summer.

Significance to the Region

New York's commercial fishing industry provides valuable fish and seafood products to the citizens of the state. While there are some people that catch their own fish and seafood for personal consumption, the vast majority of people in New York must rely on the state's commercial fishing industry for their source of fishery products. In that sense New York's commercial fishing industry provides an invaluable service to seafood consumers.

Commercial fishing harvests of Long Island Sound are sold both domestically and overseas, creating revenue for the state and local communities. The industry provides local employment, not only for commercial harvesters and employees of directly related businesses, but also for individuals working in local businesses which supply the fishing fleets. Typical purchases or expenditures made by the commercial fishing fleets include fuel, ice, repairs, mooring, hardware, and fishing supplies. The commercial fishing industry also positively affects the state and local economies through the payment of sales and property taxes and the purchase of goods and services by the households of commercial harvesters. Finally, the commercial fishing industry is important to the culture of the Sound region in that many of today's industry members and their families continue traditions handed down to them by their ancestors, despite the difficulties they encounter.

Issues

Competition For Limited Fish Resources and Environmental Stress

The commercial fishing industry is experiencing numerous problems. Chief among these are: competition for limited fish resources; competition from other uses of coastal lands and waters, primarily residential and commercial development and recreational boating; and the environmental stresses caused by human activity in and around the Sound. Commercial harvesters are competing strenuously among themselves as well as with recreational harvesters for limited fish resources. Harbors, once centers of commercial fishing activity, have become recreational boating centers and have become developed at a rapid pace. In the process, prime wetland habitats, including fish spawning and nursery areas, have been and are being compromised. In upland areas, increasing urbanization is diminishing the viability of fisheries by adversely impacting shoreline habitat and contributing to water quality problems. Contaminated seafood can pose a potential threat to human health, therefore, constant vigilance is necessary to assure that safe fishery products are brought to market. For example, increasing numbers of shellfish beds are being designated each year as uncertified due to bacterial contamination or the threat of bacterial contamination.

Economic and Operational Pressures

From an economic standpoint, new development has driven up the cost of doing business for commercial seafood harvesters. They are often not in a financial position to pay the high prices for fuel, boat maintenance, housing and other expenses which recreational boaters and other newcomers can afford. Many captains, especially in Port Jefferson and Huntington, must pay full retail prices for fuel.

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From an operating standpoint, commercial harvesters are fighting for space in the harbors where they have traditionally worked. Many harbors on Long Island Sound are so full of recreational boaters and marinas that commercial harvesters are unable to find overnight dockage and must moor offshore. In addition, because of a lack of fish landing facilities, they must pack their catches offshore and unload the boxes onto skiffs for transport to shore.

Insufficient Support Services

Onshore, commercial harvesters often lack ready access to services needed on a daily basis. These include dockside fuel tanks, ice and refrigeration, and gear storage facilities. Some ports lack dockside fuel tanks making it necessary for harvesters to truck in fuel. Harvesters also generally purchase ice from an ice producer and truck it in. Some buy it from recreational marinas or even local delicatessens. Although there are a dozen or so major refrigeration and freezing facilities on Long Island, these facilities usually have contracts with agents such as processors and buyers. Thus, harvesters are limited to dealing directly with these agents if they are to obtain refrigeration and freezing services. Vessel operators have a great deal of gear that requires storage. During fishing seasons this gear must be easily accessible. With the possible exception of Mount Sinai and Mattituck, no port provides adequate gear storage space. Such space is a critical component of efficient commercial fishing operations. All these shoreside inconveniences cut into the time available for fishing and thus into potential profits.

Commercial fishing boats require constant maintenance and repair. Unfortunately, with the exception of Greenport, major repair services for commercial vessels on Long Island are non-existent. Marinas generally cater to recreational boaters, and prices for servicing are very high. For most major repairs, owners of commercial fishing vessels on the Sound travel to Staten Island, Connecticut, Rhode Island, or Massachusetts.

Fuel Prices

In New York State commercial fishing vessel owners pay state tax on fuel, which is refunded at the end of the year after the owner submits receipts and the appropriate paper work to the New York State Department of Taxation. This process is viewed by the majority of vessel owners as an inconvenience they would prefer to avoid. In fact, many captains will purchase fuel outside of New York State where these taxes are not applicable.

Inadequate Fish and Seafood Processing Facilities

There is a shortage of fish and seafood processing facilities on Long Island, so fish and seafood is frequently shipped out of state for processing. This is especially true for Long Island Sound lobster which is shipped to other states and Canada for processing. Ironically, most of the processors in New York rely on outside sources of seafood and do not use locally harvested products. There are a number of reasons for this which include: long-established buying patterns that do not include the purchase of locally harvested products; processors' need for certain species harvested from outside the region, such as salmon and shrimp; and the inability of local harvesters to provide the necessary quantity of fish. Consequently, New York loses sales revenue and does not reap the gain which would be achieved through the value added to fish and seafood products by processing greater volumes of locally harvested seafood in Long Island plants. This is key to the growth of the industry, because processed fish and seafood receives 24 percent of every consumer dollar spent, generating more income than unprocessed seafood. Such revenues could be folded back into the local commercial

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fishing industry, processing plants, and the fish and seafood sales network, thus ensuring their continued viability in New York State.

In some instances, processors do supplement their supply with local harvests. To increase the volume of seafood processed at existing processing facilities in the Sound region, harvesters should improve their marketing efforts, and processors should become better informed about the availability of locally harvested products.

The shortage of processing facilities is due to a number of factors:

- constraints to locating facilities directly on the waterfront (e.g., a highly developed coastline, expensive waterfront property, local zoning restrictions, inadequate infrastructure)
- high energy costs
- high overland transportation costs resulting from traffic delays, the necessity of transporting products through New York City, and the expense of maintaining trucking fleets in the New York City area
- inadequate wastewater treatment capacity at municipal plants to handle the large amounts of water used in cleaning and processing seafood
- high cost of labor: to retain workers on Long Island to do messy, unpleasant work, processors must pay two or three times the minimum wage

Need for State Guidance For Aquaculture Development

The culture of aquatic animals and plants has developed into a billion dollar industry in the United States. Many states have aquaculture plans and guidelines and work with commercial harvesters or encourage and guide private-sector-led development of aquaculture facilities. Some states actively seek out aquaculture investors by offering low interest loans, grants, and technical assistance. The State of New York does not have an aquaculture plan to guide investors planning to develop aquaculture facilities in the state.

The neighboring state of Connecticut, through the Connecticut Department of Agriculture working with local commercial shellfish operations, has organized a very successful aquaculture program for the state's prime oyster seed producing areas. Since 1987, the state has invested $4.8 million dollars to restore 3,000 acres of seed beds. Connecticut's restoration program is considered by many to be the major reason for the significant increase in the state's oyster harvest, which was estimated at over $53 million in 1992. Culturists harvesting seed from the beds restored by the state must pay a 10 percent tax on the retail value of their harvest. The revenue generated by the tax is deposited into the fund to restore the beds.

Unfavorable Public Perception

Whether fresh or processed, Long Island seafood faces marketing obstacles. These are due to the general public's perception that, because the waters around Long Island are polluted, seafood harvested from these waters is not healthful to eat. This is especially so for Long Island shellfish which is often consumed raw. The shellfish industry has been undermined by adverse press reports of shellfish-related illness, which has a ripple effect on all seafood consumption.

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To assure that the public is protected from unsafe seafood products, the State Department of Health in consultation with the State Department of Environmental Conservation releases Fish Health Advisories. Care should be taken with advisories to ensure they are not misinterpreted by the media and the general public and do not result in unnecessary alarm about the safety of consuming certain species not intended to be the target of the advisory.

Party and Charter Boats for Recreational Fishing

Recreational fishing includes angling from the shore or beach, fishing from private boats, and fishing aboard a recreation-for-hire fleet. The recreation-for-hire fleet consists of both party and charter boats. There are an estimated 100 party and charter boats operating within the Long Island Sound region. The regional distribution of major port areas where concentrations of party and charter boats exist is the following: New York City—City Island; Nassau County—Port Washington; and Suffolk County—Huntington, Northport, Port Jefferson, Mount Sinai, and Mattituck.

Party boats are vessels that allow the general public to board the vessel without reservations and typically depart on a regular schedule for recreational fishing outings. These boats are large, ranging in size from 40 to 135 feet, and usually carry 35 or more passengers per trip. Charter boats, which range in size but can be as large as party boats, are vessels that have been reserved by a group or association for a recreational fishing outing on a specific date.

The majority of the estimated 100 recreational fishing vessels on the Sound are smaller charter boats called "six packs." The name comes from the license necessary to operate these boats, which limits them to carrying no more than six passengers. These boats are usually less than 40 feet long and are mostly used on a part-time basis. The owners of these boats usually have another occupation as their principal source of employment and are in the business of operating their boats for hire, usually for charter by a group or association, to supplement their income. Larger boats, seven people or more, are also used as charter boats. There are fewer of these boats on the Sound than the "six packs" and even fewer are used on a full-time basis.

Party and charter boats are recreationally and economically valuable. Party and charter boats provide access to a recreational fishery in the open waters of the Sound not otherwise accessible by those who do not have a private vessel. Statewide data from the AT Kearney Study prepared for the Department of State indicates that the leading recreational fishing activity in the state involves organized day trips on professional for-hire boats. For the years of 1984 to 1987, salt water recreational fish harvest statistics show that charter boats led other modes of recreational fishing—angling from a beach and pier, and private boats—in the number of fish caught and weight of catch. The draft Long Island Sound Study estimates that the 1990 total sport fishing value for the New York State portion of Long Island Sound was $418 million. This figure does not include the recreational boating value estimate for Long Island Sound which was $1.4 billion. The estimated values for these uses include the use value plus associated economic impacts or multiplier effects.

Availability of dock space for charter and party boats is a major problem. There are few docks on the north shore that will accept large party or charter boats. In response to the lack of dock space, some operators have resorted to open water moorings and transport passengers to and from the larger fishing vessel using a small motor boat. Due to the lack of port areas in the eastern half of the Sound, temporary docking and fuel or other services can be difficult to obtain. Port Jefferson, Mount Sinai, and Mattituck Inlet are the only port locations in the eastern end of the Sound.

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Many charter and party boats stationed in ports in the west half of the Sound are traveling with greater frequency to the eastern half of the Sound. These longer trips are necessary, because fish populations are declining in the western portions of the Sound due to a number of factors, including poor water quality and over harvesting. The decline in fish populations has resulted in increased competition between recreational fishermen and commercial harvesters for limited fishery resources.

FERRIES

Regular cross-Sound steamship connections between New York and Connecticut were established in 1883 when a group of investors formed the Bridgeport and Port Jefferson Steamboat Company. The service, inaugurated to provide the industrialized Bridgeport region with agricultural products from Long Island, has continued for over 100 years.

Today there are three ferry services providing service between Long Island and Connecticut. The Bridgeport and Port Jefferson Steamboat Company operates between Port Jefferson and Bridgeport, Connecticut. The Cross Sound Ferry Service operates between Orient Point and New London, Connecticut. It is estimated that the combined ridership of these two ferries is over 800,000 passengers and 350,000 vehicles per year. Only about 10,000 of the 350,000 vehicles are trucks. A third ferry, the Fishers Island Ferry service, operating between Fishers Island and New London, is used principally as a means to transport residents, visitors, cargo, and goods to and from Fishers Island.

A number of problems affect the ability of the existing ferry services to move goods for Long Island's businesses and to provide passenger service. These problems include: traffic congestion within the Village of Port Jefferson and low clearance in the City of Bridgeport that precludes large trucks from using ferry service. The Orient Point Ferry is of limited use due to its remote location and the approach road which cannot accommodate significant traffic volume.

In the early 1960's, fast ferry service was proposed as a desirable alternative to a third cross-Sound bridge to facilitate transportation of goods and people across the Sound. When first investigated in 1965, the ferry alternative was rejected because it was thought that future traffic volume would be too great for the ferries to handle. In the 1970's the potential environmental impacts and high cost of building a bridge over the Sound revived interest in improving ferry service.

A 1981 study, conducted by the states of Connecticut and New York, which did not recommend a route, concluded that existing service could be augmented by another ferry service. The study identified the following objectives that an additional ferry service could be expected to achieve: reduced travel time and costs for trips between Long Island and New England; reduced traffic congestion; improved connection to markets between Long Island and New England, providing an economic stimulus in both regions; reduced shipping costs; and promotion of recreation, tourism, and clean air objectives.

A 1991 feasibility study established that ferry service between Shoreham and New Haven could meet the objectives expressed in the 1981 study and holds the greatest potential for significant ridership. Such a service offers the following major advantages: accommodation of large commercial vehicles; a direct link to a deep water port in New Haven, allowing direct import and export of products by Long Island and Connecticut companies; and direct access to major highways, i.e., William Floyd Parkway and Long Island Expressway on Long Island and Interstates 95 and 91 in Connecticut.

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The Suffolk County Legislature passed a sense-of-the-legislature resolution in March 1995 supporting development of a high speed ferry. The non-binding resolution was a prerequisite for the Long Island Lighting Company to discuss leasing arrangements for the Shoreham nuclear power plant site with private ferry developers. While the Shoreham site has several positive attributes, the potential environmental impacts of a ferry service, such as the impacts of dredging, site preparation, increased traffic, the construction of terminal buildings and parking areas for cars and trucks, road improvements, and growth-inducing effects and other considerations must be addressed. Further, the effect on nearby wetlands and habitats, the use of underwater land, the dual nature of site ownership, the impacts on existing ferry services, and a proposal to install a natural gas facility on the site need to be considered.

Another type of ferry service, as yet unrealized in the region, consists of commuter ferry connections serving Manhattan from regional terminals within and outside New York City, including points adjacent to Long Island Sound. Locations that have been considered for commuter terminals on Long Island Sound to provide access to New York City are: Rye Playland, Port Chester Harbor, and Oyster Bay. Specific issues to be addressed in establishing a commuter ferry terminal are: the intended route; terminal site location; terminal site design, including provisions for adequate dock facilities, sheltered waiting areas, rest rooms, and concessions; services to be provided at the terminal; parking and suitability of landside access; and estimated costs of construction.

Recently, the High Speed Ferry Task Force which is an intergovernmental group that includes representatives from various state and city agencies, the Metropolitan Transit Authority, and the Port Authority of New York and New Jersey, announced that three companies have been chosen to negotiate for rights to operate commuter ferry routes. The routes from points located in Long Island Sound have yet to receive interest by the companies wishing to establish ferry services.

As traffic congestion and air pollution increase, transporting cargo and people on Long Island becomes more difficult and the impacts on the regional economy and environment more serious. The Northeast's coastal counties are among the most densely populated areas of the country. In 1990, the population of Nassau and Suffolk counties stood at over two and a half million. Between 1988 and 2010, this number is expected to grow by over two hundred thousand. Population increases will only worsen traffic congestion and make it more difficult to transport cargo and people to and from the region.

Increasingly, the states and localities on the Sound are treating economic and infrastructure development as a regional issue. One factor contributing to the regional outlook is the increasing time-sensitivity of inter-urban commodity flows. The current recession has forced many industries to look carefully at the costs they incur when doing business on Long Island. It is generally recognized that the "dead end" and congested transportation situation on Long Island significantly adds to the time needed to move goods. For the region to function efficiently as an economic unit, improved transportation linkages are necessary. Maintaining existing ferry services and augmenting them with newly established services will improve regional transportation linkages.

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WATERBORNE COMMERCE

The primary source for describing waterborne products that are imported to or exported from the New York State shoreline of the Long Island Sound are yearly reports published by the United States Department of the Army Corps of Engineers, titled Waterborne Commerce of the United States Waterways and Harbors, Atlantic Coast. The latest publication available was for 1989.

Most cargo and goods are brought into the Sound region through New York Harbor, or by air freight or truck. The harbors on Long Island Sound are used primarily to import petroleum products and aggregates, mostly crushed stone, by barge or tanker. In 1989, locations where petroleum products or aggregates were imported included: Port Chester, Echo Bay, Hutchinson River, Manhasset Bay, Hempstead Harbor, Glen Cove Creek, Oyster Bay, Northport Harbor, Huntington Harbor, Port Jefferson Harbor, Northville, and Silver Eel Pond. Other types of general cargo products are imported by barge or ferry, but represent a very minor amount of the total weight of products imported, usually less than five percent of the total weight of waterborne commerce shipped in an individual harbor. Harbor areas receiving general cargo in 1989 include: Hutchinson River, which received scrap metal; Northport Harbor, which received tar and asphalt products; and Hay Harbor, which received a variety of goods for Fishers Island residents.

Relatively few products are exported by vessel from Long Island Sound harbors. Although over 40 different types of goods were exported from Port Jefferson Harbor by barge or ferry in 1989, the weight of goods exported represents less than 2 percent of the total weight of waterborne commerce shipped in the harbor.

Tables 18 and 19 show tonnage figures reported by the Corps of Engineers in the Waterborne Commerce of the United States Waterways and Harbors, Atlantic Coast reports for 1973, 1976, 1981, 1986, 1988, and 1989. These years were selected to determine import and export trends for petroleum and aggregates since 1973. The figures shown in the petroleum and aggregate tables represent thousands of short tons rounded off to the nearest thousand. A short ton equals 2,000 pounds.

Petroleum products tonnage for Northville, available only for 1988 and 1989, is based on information provided by the New York State Department of Environmental Conservation, Bureau of Regulatory Fee and Oil Spill Revenue. The Corps of Engineers does not keep tonnage figures for Northville, since the offloading facility is located offshore in the Sound and not in an embayment.

Transfer and Storage of Petroleum Products

The major types of petroleum products imported at Long Island Sound harbors in New York State are gasoline, distillate fuel oil, and residual fuel oil. In 1989, these products constituted 99 percent of the total import volume of 5.1 millon short tons of petroleum products (gasoline, 44 percent; distillate fuel oil, 43 percent; and residual fuel oil, 12 percent). Jet fuel, kerosene, and miscellaneous petroleum and coal products constituted one percent of the total import volume.

Petroleum products are delivered by tanker and barge to unloading terminals in ten areas: Port Chester and Hutchinson River in Westchester County; Manhasset Bay, Hempstead Harbor, Glen Cove Creek, and Oyster Bay in Nassau County; and Cold Spring Harbor, Northport Harbor, Port Jefferson Harbor, and Northville, located in eastern Long Island

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Sound, in Suffolk County (see maps 13.0-16.6). The unloading facilities at Northport and Northville are offshore terminals in Long Island Sound where water depths are approximately 45 to 60 feet. All other petroleum unloading and storage terminals in the region are located in embayments where water depths are relatively shallow.

Petroleum unloaded from barges or tankers is destined either for three power generating plants, which also receive petroleum fuel products by truck, or for temporary storage for later consumption. In Hempstead Harbor, petroleum is unloaded at a major oil storage facility and at the Long Island Lighting Company's Glenwood Landing Power Station. In Northport, petroleum is unloaded for use by the Long Island Lighting Company's Northport Power Station only. In Port Jefferson Harbor, petroleum is unloaded at the Long Island Lighting Company's Port Jefferson Power Station and at an unloading facility that transports the petroleum by pipeline to three major inland storage facilities in East Setauket, Holtsville, and Plainview. Except for the power plant, petroleum is not stored on the Port Jefferson shoreline, as all storage terminals that had been located on the shoreline have been phased out.

Table 18 Petroleum Product Imports for Long Island Sound Region

	1973	1976	1981	1986	1988	1989
Westchester County						
Port Chester Harbor	122	184	128	67	83	74
Mamaroneck Harbor	5	--	--	--	--	--
Echo Bay	17	14	--	--	1	--
Hutchinson River	1,243	1,301	1,322	1,309	1,137	1,149
Nassau County						
Manhasset Bay	396	323	162	78	128	138
Hempstead Harbor	1,207	870	628	608	746	688
Glen Cove Creek	53	59	18	4	4	--
Oyster Bay	507	445	338	271	372	472
Suffolk County						
Northport Harbor	--	--	--	8	139	115
Huntington Harbor	13	19	--	--	--	--
Port Jefferson Harbor	3,282	3,953	2,956	2,702	3,489	2,453
Northville	N/A	N/A	N/A	N/A	1,755	1,691
Silver Eel Pond (Fishers Island)	3	2	1	--	--	--

Sources: U.S. Department of the Army, Corps of Engineers, "Waterborne Commerce of the United States, Part I, Waterways and Harbors, Atlantic Coast," 1973, 1976, 1981, 1986, 1988, 1989; New York State Department of Environmental Conservation, Bureau of Regulatory Fee and Oil Spill Revenue

NOTES: (1) Figures are for thousands of short tons rounded off to the nearest thousand. A short ton equals 2,000 pounds. Imports of less than one short ton are not shown. (2) Product types include gasoline, distillate fuel oil, residual fuel oil, jet fuel, kerosene, and miscellaneous petroleum and coal products.

As shown on table 18, the locations that receive the largest volume of petroleum products in the region are Hutchinson River, Hempstead Harbor, Port Jefferson, and Northville. For 1988 and 1989, these four locations received a yearly average of 89.5 percent of the total volume of petroleum product imports to the Long Island Sound shoreline of New York State.

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Of the 6.8 million short tons of petroleum products imported in 1989, 6.0 million short tons or 88 percent of all petroleum product imports received on the Sound shoreline were imported at these four locations. Of the 7.8 million short tons of petroleum products imported to Long Island Sound ports in 1988, 7.1 million short tons or 91 percent of all petroleum product imports received on the Sound shoreline were imported at the same four locations.

Port Chester, Glen Cove, Manhasset Bay, Oyster Bay, Cold Spring Harbor, Northport, and Silver Eel Pond import modest volumes of petroleum products. In 1988 and 1989, these locations received a yearly average of only 10.5 percent of the total volume of petroleum product imports to the New York State Long Island Sound shoreline. Glen Cove and Silver Eel Pond each received less than one short ton of petroleum imports, which is therefore not shown on table 18. Petroleum products are brought to Fishers Island by oil trucks that are transported to the island on ferries, which dock in Silver Eel Pond. The oil trucks are used for oil delivery and storage purposes, which is adequate to serve the island's needs given the small year-round and seasonal population.

Table 27 also indicates that the volume of petroleum product imports have decreased. According to industry sources, gasoline and fuel oil consumption has decreased over the past decade, in part, due to the implementation of a range of energy conservation practices. The recent recession has also reduced the consumption of petroleum products.

Aggregate Transshipment

Sand and Gravel

Sand and gravel are essential resources used mostly in the construction of roads, parking lots, foundations, buildings, and other like structures. Historically, Nassau and Suffolk counties have been a major source of sand and gravel. In years past, mostly during the post World War II growth surge, large volumes of sand and gravel were extracted by mining lands adjacent to harbors and bays, under the Sound's waters, and from inland locations. Less than 20 years ago, Nassau and Suffolk counties produced as much as two-thirds of the sand and gravel produced in the Long Island Sound region, including Connecticut.

No active sand and gravel mines remain in the coastal area of Long Island Sound, and no mining of underwater lands has occurred for over 20 years. The high cost of waterfront property and the strong market demand for residential development on the shore led to closing of waterfront sand and gravel mining operations on or near the north shore. Mining is done at inland sand and gravel mines, many of which are located near major roads such as the Long Island Expressway. For many years, Hempstead Harbor was the busiest port in the region based on the annual tonnage of materials transported (see table 19). Most of this weight reflected outbound shipments of locally mined sand and gravel from the Port Washington sand pits, which originally encompassed more than 1,000 acres.
Today, Nassau and Suffolk counties still produce significant volumes of sand and gravel, serving the needs of Long Island, but the overall volume of material produced has decreased. Sand and gravel suppliers in Nassau and Suffolk counties transport their products by truck to local construction sites. There are two principal reasons for the decline in the volume of sand and gravel exported from Long Island: there is less demand since there are fewer major road and construction projects compared to the post World War II growth era; and high land costs, preemption by other land uses, environmental regulations, and community opposition also combined to reduce the attractiveness of waterfront sites for mining and export of sand and gravel. The recent recession has further curtailed the demand for these resources.

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Table 19 Aggregate Exports and Imports for Long Island Sound Region

	EXPORTS						IMPORTS					
	1973	1976	1981	1986	1988	1989	1973	1976	1981	1986	1988	1989
Westchester County												
Port Chester Harbor	--	--	--	--	--	--	185	76	211	144	307	354
Mamaroneck Harbor	--	--	--	--	--	--	--	16	--	--	--	--
Echo Bay	--	--	--	--	--	--	40	7	--	--	--	--
New Rochelle Harbor	--	--	--	--	--	--	--	1	--	--	--	--
Hutchinson River	--	--	--	--	--	--	686	63	274	120	424	439
Nassau County												
Manhasset Bay	--	--	--	--	--	--	31	--	--	--	--	--
Hempstead Harbor	1870	88	1802	9	--	--	848	526	165	531	538	438
Glen Cove Creek	--	--	--	--	--	--	132	181	145	15	163	162
Oyster Bay	--	--	--	--	--	--	17	232	181	--	1	1
Suffolk County												
Huntington Harbor	--	--	--	--	--	--	458	198	128	--	--	--
Port Jefferson Harbor	49	17	--	3	--	--	522	372	129	361	348	344
Mattituck Harbor	--	--	--	--	--	--	147	--	--	--	--	--

Source: U.S. Department of the Army, Corps of Engineers, "Waterborne Commerce of the United States, Part I, Waterways and Harbors, Atlantic Coast," 1973, 1976, 1981, 1986, 1988, 1989.

NOTE: Figures are for thousands of short tons rounded off to the nearest thousand. A short ton equals 2,000 pounds. Imports of less than one short ton are not shown.

The sharp decrease in exports is due to the absence of waterfront area mines and underwater land mining which made exporting sand and gravel convenient and cost effective since the supply was in close proximity to port areas. Transporting inland mined sand and gravel by truck to shoreline transshipment points for export by barge is not efficient or cost effective. Supplies must be located near demand or port areas to keep costs down. The cost of sand and gravel increases rapidly when the distance to a receiving area and handling of the material increase. Shoreline mining operations located principally in New Jersey are now the major suppliers of large volumes of sand and gravel to ports in New York and Connecticut.

Crushed Stone

Crushed stone is the second largest commodity, after petroleum products, shipped on Long Island Sound. Like sand and gravel, stone is an essential resource used in the construction of roads, parking lots, and structures. Stone is also used in shoreline projects to construct jetties, groins, and revetments. Significant volumes of crushed stone must be imported, since there are no stone reserves in the Long Island Sound region. The major sources of stone are quarries located in the lower Hudson Valley region and western Connecticut. Barges are used as the principal means to transport stone from these quarries to north shore bays and harbors.

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When fully loaded, barges carrying stone have a relatively shallow draft. Transshipment points for stone imports in the region are: Port Chester and the Hutchinson River in Westchester County; Hempstead Harbor, Glen Cove, and Oyster Bay in Nassau County; and Port Jefferson in Suffolk County (see maps 13.0-16.6). Stone is delivered by barge to distributors or asphalt and concrete manufacturers located either on the shoreline or inland. If distributors or users are located inland, the stone is transported from barge by truck to the inland location.

Significance to Region

Industry sources indicate that approximately 80 to 90 percent of petroleum supplies that are brought into the Long Island region are delivered by tanker or barge. The remaining 10 to 20 percent of petroleum supplies are brought by truck from tank farms in New Jersey. Transporting petroleum supplies into the region by barge is preferred to truck transportation, since it is less expensive to import petroleum by bulk on barges or tankers than by smaller volumes in trucks. Vessel transportation is also preferred to truck transportation for environmental reasons. Oil delivery vehicles damage roads, contribute to traffic congestion, and increase air and noise pollution. Rail transportation is not a viable transportation option, since the existing railroad system is geared towards commuters, not petroleum transport.

After petroleum products, crushed stone is the most important commodity shipped to Long Island Sound. Transportation by barge is by far the most cost effective and best way to facilitate the movement of crushed stone into the region. The cost of stone increases rapidly with distance to a receiving area and with additional handling of the material. A barge typically transports one thousand tons of stone. It would take forty truck loads to transport the same amount of stone into the region. Transporting stone by truck over long distances, combined with increased handling costs, would dramatically increase the cost and perhaps make it prohibitive.

Transporting stone by rail is currently not a viable alternative, since rail transportation in the region is geared towards passenger service, not freight. For example, despite the efforts by the Long Island Rail Road to revitalize its freight rail service, less than one percent of the total freight shipped on Long Island, estimated to be 93 million tons a year, is shipped by rail. The major impediment to transporting freight by rail to and from Long Island is competition for rail time from the 700 plus daily passenger trains. This results in most freight being moved either in the middle of the day between rush hours or at night when there is little commuter traffic.

Issues

Completing Offshore Unloading System

Transporting petroleum by tanker and barge is an efficient, cost effective way to move petroleum supplies into the region. However, the present system of petroleum importation presents environmental and land use concerns. Most of the existing petroleum terminals are located at the heads of embayments or in other poorly flushed and highly developed areas. Terminals located in these areas create a number of serious problems:

- Nearly all of the region's major embayments and associated natural resources are exposed to the threat of damage from oil spills. This is due to the fact that most terminals are located in shallow embayments, and the small to moderate ocean tankers and barges that deliver the petroleum have relatively deep drafts, ranging from 12 to 28

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feet. These two factors increase the likelihood of accidents and spills. Even small barges often have to wait for high tide before they can navigate shallow channels.

- In the shallow embayments, dispersal and dilution of pollutants, such as oil or suspended solids are poor when compared to the open waters of the Sound. Suspended or resuspended sediment and the wakes generated by propeller wash can significantly affect natural shoreline protective features, wetlands, habitats, and wildlife.

- Low flushing rates of shallow embayments result in high siltation rates within navigation channels, resulting in more frequent maintenance dredging. This is particularly true at embayment heads where surrounding urban development contributes large quantities of silt-laden runoff.

- Storage tanks and terminal docks take up valuable commercial waterfront space and can present safety and aesthetic problems. Petroleum storage tanks are no longer strictly water-dependent facilities, since oil can be unloaded at offshore platforms and the petroleum product piped to inland storage locations.

- Tanker and barge traffic can pose hazards to other harbor users, such as large and small recreation vessels, commercial fishing vessels and operations, and swimmers, especially within confined waterways.

To address these concerns, the feasibility and benefits of completing a system of offshore unloading terminals and submarine pipelines to transport petroleum to inland locations using the existing, partially completed system should be explored. Industry sources have indicated that a completed system of offshore unloading terminals and pipeline systems to serve barges and tankers in the Sound is considered the most desirable and efficient way to transport petroleum supplies in the region.

The completed portion of the existing pipeline system consists of three main components: (1) two offshore unloading terminals at Northport and Northville, (2) submarine pipelines that transport oil from the offshore unloading terminals to inland storage tanks, and (3) an overland pipeline distribution system which transports petroleum unloaded in Port Jefferson Harbor to inland storage tanks. The pipeline travels from Port Jefferson, south to East Setauket, south to Holtsville, and west to Plainview, a combined total distance greater than 30 miles.

A completed pipeline system would eliminate the need for: (1) large petroleum carrying vessels and barges to enter embayments and cause associated adverse impacts, (2) location of petroleum storage facilities on the waterfront, and (3) federal dredging projects in shallow harbors.

Phasing Out Smaller Facilities

Transshipment and storage facilities located in Port Chester, Glen Cove, Manhasset Bay, Oyster Bay, and Cold Spring Harbor should eventually be phased out, since only a relatively small percentage of the total volume of petroleum products that are brought into the Sound are imported at these locations. The benefit of maintaining these uses does not outweigh the risks associated with oil or gasoline spills or leaks, which could cause immeasurable damage to natural resources and impair or ruin the use of the harbor area for water-dependent recreation and commercial activity. The facilities could be phased out by permitting displacement by other uses when redevelopment is proposed.

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Phasing out the remaining smaller petroleum transshipment and storage facilities on the Sound would be consistent with a closure trend that has occurred in the region for over 20 years, as indicated by table 27. Locations where onshore transshipment and storage facilities have been removed or abandoned include Port Chester Harbor (one facility remains), Mamaroneck Harbor, Echo Bay, Glen Cove (one facility remains), Huntington Harbor, Port Jefferson, Mattituck Inlet, and Silver Eel Pond. This same closure trend has occurred in the nearby Peconic Bays, as demonstrated by the closure of the transshipment and storage terminals in Greenport Harbor and Sag Harbor. The storage facilities at these locations have either been removed or are abandoned.

Reducing Damage from Spills

Spills during transfer of petroleum products are also a concern. Petroleum spills have occurred in surface waters at various transfer facilities, including spills while unloading barges at facilities located onshore and offshore and spills from vessels grounded during storms. Underground spills have also occurred at petroleum storage facilities, most recently at the storage facility in south Setauket, which receives petroleum from the Port Jefferson off loading pipeline.

The United States Coast Guard Captain of the Port for Long Island Sound assumes primary authority and responsibility for supervising responses to petroleum spills in the Sound. Local governments, under the supervision of the Captain of the Port, also respond to spills and occasionally provide equipment and personnel for spill containment and clean-ups. Petroleum companies also provide personnel and equipment for spill containment and clean-up under supervision of the Captain of the Port and the New York State Department of Environmental Conservation. Neither the federal government nor the state has completed a fully coordinated oil spill contingency plan for Long Island Sound.

The Department of Environmental Conservation and local emergency service agencies have the primary responsibility for responding to underground spills. The Department of Environmental Conservation also has the primary responsibility for ensuring that underground spills are mitigated by the person responsible for causing the spill or discharge.

Maintaining Transshipment Points for Aggregates

Maintaining transshipment points along the Sound shoreline is necessary to ensure that aggregates can be easily imported and, if necessary although unlikely, exported from the region. These points are necessary to ensure convenient and efficient delivery of aggregates to distributors and customers and to keep the costs down. Maintaining transshipment points on the Sound will also help to ensure a diversified maritime economy.

COASTAL AGRICULTURE

In the Long Island Sound coastal area, there are 1,964 acres of agricultural land, most of which is located in the eastern Suffolk County towns of Riverhead, Southold, Southampton, and East Hampton, although small, isolated pockets of agricultural land exist in the coastal area in western Suffolk County. No agricultural land exists in the coastal area of Nassau and Westchester counties or New York City.

Six percent of Suffolk County's 34,000 acres of farmland is in the coastal area. Approximately 1,700 acres of agricultural land in the coastal area are located in the northern portions of two state agricultural districts: District 1 in Southold, which contains a total of 4,751 acres; and District 7 in Riverhead with a total of 2,063 acres. Approximately 25

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percent of each district is located in the coastal area. State agricultural districts 2 and 6, which are significantly smaller than Districts 1 and 7, are located near but outside the coastal area boundary. District 2 is located in Brookhaven and consists of 321 acres; District 6, in Riverhead, consists of 545 acres.

During the colonial period, farming in the region supplied households and local communities with hay and cordwood as cash crops. Farmers soon began to raise livestock for sale and shipment to more distant locations. As land near New York City became more valuable, the type of farming changed from grazing to grain production. The opening of the Erie Canal in 1825 allowed produce and grains from the western part of the state to be shipped efficiently to New York City. This competition, during the nineteenth and early twentieth centuries, led to the more intensive agricultural operations, such as vegetable, potato, and poultry farming in the Sound region which displaced grain cultivation.

The estate era, during the early twentieth century, had a major effect on farmland. Estates and related uses such as country clubs, polo fields, golf courses, and horse racing stables, replaced many farms. The post-World War II population growth, which was the largest growth period in the region and characterized by massive urbanization, further reduced the amount of farmland. Just after World War II, during Suffolk County's peak production period for vegetables, potatoes, and fruits, there were over 120,000 farmland acres. By 1972, there were only 60,000 farmland acres. Twenty years later, in 1992, the amount of farmland had been further reduced to 34,000 acres. This represents a 44 percent reduction in farmland acreage since 1972 and a 72 percent reduction since the end of World War II.

In the years since World War II, economic pressures from increasing operating costs related to land, taxes, labor, and utilities forced many farmers to shift from traditional potato and vegetable farms to higher return nursery stock and vineyards. Many farmers who did not move to higher-return produce abandoned farming. Nevertheless, Suffolk County today continues to lead all other counties in the state in wholesale value of agricultural products sold. As agriculture continues to change in Suffolk County, the trend is toward making higher capital investments on less land, requiring intensive and more skilled labor to produce a higher rate of return.

Favorable growing conditions contribute to the diversity and volume of Suffolk County's agricultural products. The soils in Suffolk County are primarily Class 1 and 2 according to the New York State Department of Agriculture and Markets Land Classification System and are the richest, most fertile soils in the state. These loamy soils exist on a slight to moderate slope. These two factors combined with the relatively warm, insulating coastal climate, which extends the growing season, allow for a diversity of produce, including a variety of ornamental landscape products, grapes and other fruits, potatoes and over 60 types of vegetables. In comparison, upstate Wyoming County ranks second to Suffolk County in agricultural products sold, even though it has over four times the amount of farmland acreage. Wyoming County's colder climate and shorter growing season, clay soils, and more difficult topography limit farm produce to mostly hay and corn silage for dairy cattle feed for milk production.

According to a 1990 report prepared by the Suffolk County Planning Commission, titled Farmland Preservation Program History and Current Perspective, approximately 7,000 farmland acres in the county have been protected, 20 percent of the county's remaining 34,000 acres of farmland. Six techniques are being used by Suffolk County and local governments to preserve farmland:

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- Purchase of development rights has been used by Suffolk County and the towns of Southold, Southampton, and East Hampton as a primary method to preserve farmland. Over 6,100 acres have been preserved using this technique, about 5,000 acres by the county and 1,100 acres by the towns.

- Four towns, Riverhead, Southold, Southampton, and East Hampton, are using clustering to protect significant farmland tracts. Over 530 acres have been protected through clustering.

- Transfer of development rights has been used to a limited degree by Riverhead to protect 130 acres in an instance where a single landowner held title to both the land from which the rights where transferred and the receiving land.

- Land trusts are also helping to preserve farmland, over 250 acres have been protected through donations or easements.

- Outright acquisition has also been used by Suffolk County, but only to a limited degree, to protect farms of significant historic value or for watershed protection purposes.

- State agricultural districts provide incentives for farmers to stay in agriculture through lower tax assessments and protection from nuisance suits. There are seven agricultural districts in Suffolk County covering 11,764 farmland acres. State agriculture districts, however, do not provide permanent protection.

In combination, these techniques are being used to preserve or encourage the preservation of agricultural land in Suffolk County.

Significance to Region

Long Island Sound farms provide area and regional markets with locally produced fruits, vegetables, nursery stock, and wine. In addition, farmland provides significant open space and maintains the community character important to tourism in eastern Suffolk County.

Despite the continuing decline of farmland acreage, Suffolk County continues to be the leading agricultural county in the state, based on the wholesale value of agricultural products sold. In 1987, according to the United States Agriculture Census, Suffolk County led with $114 million in market value of agricultural products sold. Although census data is not yet available for 1992, Suffolk County is expected to lead again with an estimated $120 million in agricultural products sold.

Suffolk County's good agricultural performance is due to the growth in nursery and greenhouse products, which accounted in 1987 for a majority of market sales with $67 million and, in 1992, is estimated to account for $75 million in market sales. Suffolk County accounts for close to 50 percent of the total production of nursery and greenhouse stock in New York State. Many of Suffolk's nursery and greenhouse operations consist of modern production facilities that produce unique and specialized products that are sold throughout the Northeast.

In addition to nursery and greenhouse products, emerging agricultural uses are vineyards, vegetables targeted specifically for New York City's specialty markets, and sod farms. Over the past 20 years, the most significant change has been in the production of grapes and wines. Before 1973, only a few acres of grapes were grown for commercial purposes and none for wine. Today, approximately 1,600 acres have been planted for grape production

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and there are over 16 wineries in Suffolk County. Long Island produces only 2 percent of the total volume of wine in New York State, but this volume represents a considerable amount of the premium wine sales in the state.

These newer agricultural uses have replaced many of the more traditional vegetable, duck, and potato farms. Only 6,500 acres remained in potatoes in 1992, considerably less than the 19,000 acres committed to potato production in 1982, but despite the sharp reduction in acres in potatoes, Suffolk County is a leader in the state in potato production.

Issues

Despite the distinction of having the richest, most productive soils in the state and leading all other counties in the state in wholesale value of agricultural products sold, farming and farmland acreage continues to diminish in Suffolk County due to economic pressures and inadequate protection measures. Within the coastal area, protecting farmland is made more difficult by inherent conflicts that exists between efforts to protect coastal farmland and efforts to protect inland farmland and important groundwater recharge areas.

Although most of the farmland in the coastal area is located in state agricultural districts, the agricultural districts do not provide permanent protection for the farmland. Agricultural districts temporarily preserve farmland, since they are geared to an eight year tax reduction period. The district provides a tax reduction and can protect a farm area from inappropriate assessments for services or utilities. However, land owners may drop out of the program at any time and sell their land for development if the back taxes, plus interest, are repaid.

Most of the farmland acreage in the coastal area of Riverhead and Southold is zoned for residential use requiring a minimum lot size of one or two acres for a single family dwelling. A tract of farmland in Southold is zoned for Agriculture-Conservation; however, residential use is permitted provided the minimum lot size is two acres. While this type of zoning may be effective in ensuring low density residential development, it has not been effective in preserving farmland for agricultural use.

When transfer of development rights or clustering are used to protect large inland tracts of farmland, an often unfortunate consequence is to shift residential development to or near to the coastal area. Clustering, as well as acquistion, is also being used to protect Special Ground Water Protection Areas. Although Special Ground Water Protection Areas are generally located inland away from the coastal area, when clustering is used to protect a Special Ground Water Protection Area that is near the coastal area, residential development is often located near the coast or in existing hamlets to protect deep water recharge areas located further inland. As with the techniques used to preserve inland farmland, the result is to increase residential development pressures on coastal farmland.

Agricultural practices themselves can also adversely affect the long-term viability of farmland. Erosion, loss of soils, and the excessive use of pesticides and fertilizers can diminish the value of agricultural land, as well as the quality of the environment, in general, particularly the quality of groundwater, surface water, and wetlands.

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DREDGING

Dredging in the Long Island Sound region is necessary to maintain sufficient navigation channels and basins for commercial and recreational navigation. Dredging is also necessary for the placement of submarine pipelines and cables in the Sound. All major dredging projects in the region are undertaken by the federal government, often with local assistance. In addition to major federal dredging projects, relatively small-scale dredging projects are undertaken by local governments and the private sector to provide access, often from larger public channels, to public or private waterfront uses and facilities.

MAJOR PUBLIC DREDGING PROJECTS

Major public dredging projects have been undertaken primarily by the federal government to maintain and promote waterborne commerce and passenger transportation to and from the Hutchinson River in New York City and Westchester County; Little Neck Bay in New York City and Nassau County; Port Chester, Milton, Mamaroneck and New Rochelle Harbors in Westchester County; Manhasset Bay, Hempstead Harbor and Glen Cove Creek in Nassau County; Huntington Harbor, Northport Harbor, Port Jefferson Harbor, Mattituck Inlet and West Harbor (Fishers Island) in Suffolk County. These projects have consisted of approach channels from Long Island Sound into well-defined embayments and harbors to support water-dependent commercial or industrial uses. In some instances, basins inside well-defined commercial harbor areas were dredged for temporary and long-term anchorages and vessel turn-around areas.

Most developed harbors on Long Island Sound have been transformed from water-dependent commercial and industrial uses to harbors dominated mostly by recreational uses. In Port Jefferson, where this transformation has occurred fairly rapidly, the trend has been to replace water-dependent and non-water-dependent industrial uses with water-dependent recreation or water-enhanced uses. Examples of uses that have been removed or reduced in number on the Sound are: marine contracting and construction services, docks for tugboats and barges, sand and gravel mining and transshipment, boat yards, petroleum storage tanks, and storage yards for imported crushed stone. In many areas waterfront sites once occupied by water-dependent industrial uses are now used principally for marinas, yacht clubs, water-enhanced, or residential uses. This change in uses from water-dependent commercial and industrial uses which utilized large, deep-draft vessels has reduced the need for maintaining large, deep channels and basins as originally authorized in some areas. Some federally authorized channel and basin projects to support water-dependent industrial uses never began, such as a 1.4 mile long channel and a turning basin in the south end of Manhasset Bay, or are partially completed but no longer necessary, such as most of an authorized channel in the south end of Hempstead Harbor where water-dependent commercial and industrial uses no longer exist. These channels and projects are shown on maps 13.0-16.6 and tables 20, 21, and 22.

Existing water-dependent commercial or industrial uses dependent on dredged channels, such as petroleum transfer and storage facilities, aggregate transshipment, other waterborne cargo, vessel building and repair, interstate ferries, and commercial and recreational fishing support facilities, are important to maintain. These uses are shown on maps 13.0-16.6. Maintaining existing channels and basins within these areas is necessary to ensure the continued function of these uses.

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Smaller Public and Private Dredging Projects

Small public dredging projects are typically undertaken by local, and sometimes county, governments without federal or state assistance. No state dredging projects, large or small, have been undertaken in the Long Island Sound. The small public projects are usually limited to establishing or maintaining channels to provide recreational boating access to discrete public facilities such as marinas, boat ramps, or boat anchorage basins. Areas where small-scale dredging has occurred include: Manorhaven and Port Washington, Glen Cove, and Oyster Bay in Nassau County; and Huntington Harbor, Northport Harbor, Port Jefferson Harbor, Mount Sinai Harbor, Nissequogue River, Stony Brook Harbor, and Wading River Creek in Suffolk County. Specific projects are: Tide Mill Creek channel (Oyster Bay); Oyster Bay Town Marina channel and basin (Oyster Bay); Nissequogue River channel (Smithtown); Porpoise Channel, Smithtown Town Marina and town anchorage in Stony Brook Harbor (Smithtown); the Yacht Club Spur channel in Stony Brook Harbor (Smithtown and Brookhaven); Setauket Harbor Channel (Brookhaven); Brookhaven Town Dock and Marina in Port Jefferson Harbor (Brookhaven and Port Jefferson); and Mount Sinai Harbor Channel. A small channel was dredged by Suffolk County to Centerport Harbor in the early 1970's that does not lead to or support public facilities.

Private dredging projects are undertaken mostly to create and maintain channel spurs from larger public channels to private water-dependent commercial or industrial uses. They are also undertaken to create sufficient basin depths for vessels within and adjacent to water-dependent uses such as boat ramps or other hauling or launching areas, service centers, sales centers, yacht clubs, and beach clubs that are located in appropriate locations. Most of these projects are located within maritime centers where concentrations of water-dependent uses are located. Outside of the maritime centers private dredging is limited to a few discrete areas, primarily: small sections in south Port Washington Harbor and the Mill Creek channel to Oyster Bay Harbor in Nassau County; the Long Island Lighting Company cooling water basin in Northport; portions of the Nissequogue River channel south of a town mooring area; the Stony Brook Harbor Yacht Club spur extension southwest of a town boat ramp to a yacht club basin; the Shoreham Long Island Lighting Company generating facility basin; and portions of Mattituck Creek in Suffolk County. A private dredging project was completed to create a navigation channel in Cold Spring Harbor to provide commercial vessel access to petroleum transshipment and storage facilities located on the southeast shore of the harbor. Another private dredging project, involving approximately 100 cubic yards of dredge spoil, was completed in Hay Harbor on Fishers Island. The project had the effect of straightening and providing a uniform depth in the access channel as well as improving tidal flushing and water quality. The small channel in Hay Harbor, which is not used for commerce, is difficult to navigate since it is curved and has a depth of only 2 1/2 feet at low tide.

Private dredging is also conducted to complete shoreline fortification projects for commercial or residential uses such as the installation of new, or the repair or replacement of, bulkheads, revetments, and groins. Dredging projects are also undertaken to establish or maintain basins adjacent to bulkheads to moor recreational vessels for residential uses.

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Table 20 Dredging Projects, Westchester County

WATERBODY AND EXISTING USES	AUTHORIZED DATE AND DIMENSIONS	STATUS TO DATE	RECOMMENDATIONS
Port Chester Harbor[1,2] - marina/yacht club - commercial fishingC - oil transfer - aggregate transshipment	1910, commercial channel and boat basin Channel 1.7 miles long (depth ranges from 3' to 12', width ranges from 100' to 175')	Completed as authorized	Maintain as authorized to support water-dependent commercial, recreational, and industrial uses. Spoil Disposal: CLIS Responsibility: Federal
Milton Harbor[2] - marina/yacht club - public anchorage and boat ramp	1965, Channel 1.87 miles long (depth of 6'; width ranges from 50' to 70')	Completed as authorized	Maintain as authorized to support water-dependent recreational uses. Spoil Disposal: WLIS Responsibility: Federal, State, Local
Mamaroneck Harbor[1,2] - marina/yacht club - boat yard - public anchorage and boat ramp	1922, 1935, 1960 Main channel (depth of 10', width ranges from 80'to 100'); branch channel (depth of 6', width of 80'); west basin anchorage (depth of 6'); east basin anchorages, (depths of 6' and 10')	Completed as authorized	Maintain as authorized to support water-dependent commercial, industrial and recreational uses. Spoil Disposal: WLIS Responsibility: Federal, State, Local
New Rochelle Harbor[1,2] - marina/yacht club - anchorage and boat ramp	1922 0.4 miles long (depth of 8'); second channel (depth of 8; width of 120')	Completed as authorized	Maintain as authorized to support water-dependent recreational uses Spoil Disposal: WLIS Responsibility: Federal, State, Local
Echo Bay[1,2] - marina/yacht club	1910, 1973 channel 0.3 miles long (depth of 10') Channel turning basin (depth of 10'deep); 2 anchorages (depths of 6' and 7')	Channel and turning basin completed as authorized anchorage not dredged	Maintain channel and turning basin only. Spoil Disposal: WLIS Responsibility: Federal, State, Local
Hutchinson River[2] - aggregate transshipment - oil transfer	Channel 1941 5 miles long (depth of 10'; width ranges from 150'to 500'), has y-shaped upper reach	Partially completed as authorized	Complete and maintain as authorized for complete and water-dependent industrial uses Spoil Disposal: WLIS and Mud Dump Responsibility: Federal

WLIS: Western Long Island Sound CLIS: Central Long Island Sound

[1]Proposed Maritime Center
[2]Existing Federal Navigation Channel

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Table 21 Dredging Projects, Nassau County

WATERBODY AND EXISTING USES	AUTHORIZED DATE AND DIMENSIONS	STATUS TO DATE	RECOMMENDATIONS
Little Neck Bay - marina/yacht club - public anchorage	1962 Entrance channel (depth of 7', width of 200'); anchorage (depth of 7', 350 acres)	Completed as authorized	Maintain as authorized for water-dependent recreational uses and anchorage. Spoil Disposal: WLIS or upland uses Responsibility: State, Local
Manhasset Bay[2] - marina/yacht club - boat yard - oil transfer - public anchorage and boat ramp	1930 Channel 1.4 miles long (depth of 8', width of 100'); turning basin (depth of 8')	No work done	Maintain partial length for water-dependent uses, phase out southern half of channel. Spoil disposal: WLIS Responsibility: Federal, State, Local
Hempstead Harbor[2] - marina/yacht club - oil transfer - aggregate transshipment - public anchorage and boat ramp	1910, 1968 Channel 2.3 miles long (depth ranges from 6' - 13', width ranges from 70' - 150'); turning basin (depth of 9', 2 acres)	Only 16 per cent of work comleted (south of NYS Rte. 25A)	Discontinue and phase out all but the northernmost 20 percent which supports petroleum and aggregate transshipment. Spoil Disposal: WLIS Responsibilllity: Federal, State, Local, Private
Glen Cove Creek[1,2] - marina/yacht club - boat yard - oil transfer - aggregate transshipment	1925 Channel 1.0 miles long (depth of 8', width of 100')	Completed as originally authorized, channel widening in upper reaches not completed	Maintain original channel only as authorized, complete remaining widening only after, or as part of, Superfund remediation. Spoil Disposal: As determined by superfund remediation plans responsibility: Federal, State, Local, Superfund parties.
Oyster Bay[3] - marina/yacht club - boat yard - oil transfer - aggregate transshipment - commercial fishing - public anchorage and boat ramp	2 small, shallow entrance channels to basins and boat ramp	Completed	Maintain as authorized. Spoil Disposal: WLIS Responsibility: Local, Private

WLIS: Western Long Island Sound **CLIS:** Central Long Island Sound

[1]Proposed Maritime Center
[2]Existing Federal Navigation Channel
[3]Local Navigation Project

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Table 22 Dredging Projects, Suffolk County

WATERBODY AND EXISTING USES	AUTHORIZED DATE AND DIMENSIONS	STATUS TO DATE	RECOMMENDATIONS
Cold Spring Harbor[3] - marina/yacht club - oil transfer - public boat ramp	Shallow approach Channel .5 miles long (depth ranges from 7' - 12'; width ranges from 50' - 100')	Completed	Maintain as authorized to support water-dependent commercial, recreational, and industrial uses. Spoil Disposal: Beach nourishment for clean material, WLIS or CLIS for fine spoil Responsibility: Private, Local (when public facilities are in place)
Huntington Harbor[1,2] - marina/yacht club - recreational fishing - (party & charter boats - commercial fishing - public anchorage	1890, 1938 Channel 2.2 miles long (depth ranges from 6' to 8', width ranges from 100' to 200') anchorage (depth of 6')	Completed as authorized	Maintain as authorized to support water-dependent recreational uses and commercial fishing. Spoil disposal: Beach nourishment for clean material, WLIS for fine spoil Responsibility: Federal, State, Local
Centerport Harbor - boat yard	Shallow approach channel 1,850' long (depth ranges from 6' - 10'; width of 150')	Completed	Discontinue.
Northport Harbor[1,2] -marina/yacht club - recreational fishing (party & charter boats) - commercial fishing - public anchorage	1945 Channel 0.4 miles long (depth of 8', width of 100'); anchorage (depth of 6', 15 acres)	Completed as authorized	Maintain as authorizedd to support water-dependent recreational uses and commercial fishing. Spoil disposal: Beach nourishment for clean material, WLIS for fine spoil Responsibility: Federal, State, Local
Nissequogue River[3] - yacht club - public boat ramps - public anchorage areas	Entrance channel from Sound to Kings Park Psychiatric Center (KPPC) and boat ramp	Completed	Maintain as authorized to 6' only to Town boat ramp and mooring areas. KPPC ramp converts to public use, maintain channel ramp at depth of 6'. Spoil disposal: Beach nourishment and habitat creation Responsibility: Local, State (if boat ramp at KPPC converts to public use)

WLIS: Western Long Island Sound **CLIS:** Central Long Island Sound

[1]Proposed Maritime Center
[2]Existing Federal Navigation Project
[3]Local Navigation Project

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Table 31 Dredging Projects, Suffolk County–*continued*

WATERBODY AND EXISTING USES	AUTHORIZED DATE AND DIMENSIONS	STATUS TO DATE	RECOMMENDATIONS
Stony Brook Harbor[3] - marina/yacht clubs - boat yard - public anchorage and boat ramps	Porpoise Channel, yacht club spur, and Long Beach anchorage to 6' depth	Completed	Maintain existing dredged channels and anchorage at depth of 6' Spoil disposal: Beach nourishment. Responsibility: Local
Setauket Harbor[3] - Boat yard - commercial fishing - public anchorage	Shallow approach channel (depth of 4'- 6' from Port Jefferson Harbor to public dock in Setauket Harbor	Completed	Maintain as authorized to support water-dependent commercial and recreational uses. Spoil disposal: Beach nourishment Responsibility: Local
Port Jefferson[1,2] - marina/yacht club - recreational fishing (party & charter boats) - commercial fishing - public anchorage	1890, 1894, 1930, 1968 Channel 2.3 miles long (depth of 40'; width of 350), turning basin (depth of 30; 23 acres)	Channel partially dredged to 16' to 26' only Turning basin not dredged	Maintain channel only to 26 feet deep to support water-dependent industrial, commercial, and recreational uses. Spoil disposal: Beach nourishment for clean material, CLIS for fine spoil Responsibility: Federal
Mt. Sinai Harbor[3] - public marinas - boat yard - public boat yard - commercial fishing - anchorage (town only)	Entrance channel and channel leg to Town ramp	Completed	Maintain existing dredged entrance channel and channel leg to public marina ramp to 8' deep. Spoil disposal: Beach nourishment for clean spoil CLIS for fine spoil Responsibility: State (only if anchorage open to public), Local
Wading River[3] - public boat ramp	Entrance channel to Town boat ramp near mouth of creek	Completed	Maintain as authorized. Spoil disposal: Beach nourishment Responsibility: Local
Mattituck Harbor[1,2] - marina/yacht club - recreational fishing - (party & charter boats - commercial fishing - public anchorage	1986, 1935, 1964 Channel, 2.0 miles long (depth of 7', width of 80' to 100') anchorage (depth of 7', 6 acres)	Completed as authorized	Maintain as authorized to support commercial fishing, water-dependent recreational uses, and anchorage area. Spoil disposal: Beach nourishment Responsibility: Federal, State, Local
West Harbor[2] - marinas - public anchorage	Channel 0.4 miles long (depth of 14'; width of 100')	Completed as authorized	Maintain at depth of 8' Spoil disposal: CLIS Responsibility: Federal, Local

WLIS: Western Long Island Sound **CLIS:** Central Long Island Sound

[1]Proposed Maritime Center
[2]Existing Federal Navigation Project
[3]Local Navigation Project

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Spoil Disposal

Historically, dredge spoil was primarily disposed of in intertidal or adjacent upland areas within harbors, moved by truck or barge to inland locations for use in construction or as fill material, or disposed of in landfills. Increasingly, spoil has been deposited in disposal sites in the Sound, as upland disposal options were constrained by new regulations, limited landfill space, and lack of markets for clean dredge material. Dredge spoil is most often dumped in Long Island Sound disposal sites when the spoil is contaminated. Contaminated spoil often originates in maritime centers where sediments are contaminated from former industrial uses, existing uses, or upland runoff. Approved offshore disposal sites for contaminated spoil are located in western and central Long Island Sound.

Regulations for disposing of contaminated spoil offshore and associated costs for testing, transporting, and capping contaminated material have constrained dredging, primarily in Westchester County. Testing and monitoring are required for individual projects before, during, and after dredging and spoil disposal. These requirements become more onerous and costly with larger projects. This has resulted in sponsors avoiding large-scale projects and has discouraged them from coordinating small dredging projects with other project sponsors. Numerous small, individual projects repeated over a period of time result in a series of continued disturbances and greater cumulative and secondary impacts to natural resources than if a larger project or a series of projects were conducted at one time. It appears as though testing requirements are imposed unilaterally, rather than being based on characteristics of a project site and proposed spoil disposal location.

With limited, but increasing frequency, clean dredge spoil is being put to better use for beach nourishment or other shoreline enhancement purposes. However, significant volumes of dredge spoil are still trucked away and used for non-coastal purposes, sometimes disposed of in valuable landfill space. This results in the loss of sand supplies from the coastal system and its beneficial use where it is most needed.

Issues

Need to Maintain Existing Channels and Basins

The continuation and promotion of water-dependent uses in maritime centers and other limited areas outside of maritime centers depend upon channel or basin dredging. Navigation channels and basins need to be maintained to support existing and attract new water-dependent uses which rely on and benefit by sufficient navigation channels and basins. Dredging is necessary, particularly in maritime centers, to ensure waterborne transportation, commerce, and recreation. Deep draft channels which support water-dependent commercial and industrial uses need to be maintained. There is also a need to maintain smaller basins and spur channels that serve uses such as yacht clubs, boat ramps, service centers, sales centers, and beach clubs that are located in appropriate locations.

Less dredging would be necessary if less sediment from upland sources reached the Sound's channels and basins. An increase in the number and maintenance of silt traps and catch basins is necessary, as well as increased implementation of other nonpoint source management measures, to better control upland or upstream sources of silt from reaching coastal waters.

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Reduce Channel Depths and Discontinue Dredging Where No Longer Necessary

Some channels or channel segments no longer support water-dependent commercial or industrial uses and are no longer needed. Other channels do not need to be as large or as deep as authorized. Discontinuing projects that are no longer necessary and undertaking maintenance projects at shallower depths reduces unnecessary dredging, the overall volume of spoil, and associated natural resource impacts.

Need to Maintain Federal Involvement in Maintaining Channels and Basins

Although the need to maintain federally authorized channels and basins has waned in harbors where there has been a transition from water-dependent commercial and industrial uses to public and private recreational uses such as marinas, there is still a need to maintain these channels to support water-dependent recreational uses. The Corps of Engineers has a general policy not to maintain federal channels or basins which do not support water-dependent commercial or industrial uses which utilize waterborne transportation. Under existing Corps of Engineers policy, the Corps will not maintain these federally authorized and dredged channels and basins, even though recreational water-dependent uses are dependent upon the continuation and maintenance of the channels and basins at depths shallower than originally authorized. Recreational uses such as marinas are important to the region, the state, and the northeastern United States, since they support interstate commerce through recreational boating and its associated businesses. The continuation and maintenance of federal channels and basins are essential to the continuation, maintenance, and expansion of water-dependent recreational businesses in Long Island Sound, ensuring safe navigation, and the continuation and maintenance of the state's and the region's port infrastructure.

State Involvement is Needed in Maintaining Channels and Basins

Navigation channels are critical components of the state's transportation system, yet the state does not contribute to the maintenance of these channels. The federal government and local governments bear the full burden of all dredging projects in the Sound. The state's interests in maintaining navigation channels are no different than its interest and obligation in maintaining roads and highways, especially where navigation channels support important water-dependent uses. The state's interest in maintaining channels and basins should be highest in maritime centers that support concentrations and a mix of water-dependent commercial, industrial, and recreational uses.

Need for Improved Coordination of Dredging Projects and Spoil Disposal

Lack of coordinated management and oversight of dredging projects in the Sound raises several issues. Lack of coordination typically results in: the misuse of valuable sand supplies for non-related shoreline projects; excessive delays in completing simple maintenance dredging because suitable spoil sites remain unidentified; and dredging sponsors not being able to take advantage of combining their projects to reduce costs. Natural resources also are adversely impacted, since repeated small-scale projects increase sedimentation, exposure of organic and inorganic pollutants to the water column, disturbances to benthic organisms, and changes in chemical and biological parameters at and near dredging and spoil disposal sites. Clean dredge material is often removed from the waterfront and not used for purposes that benefit the shoreline. Dredged sand and gravel from well-flushed channels usually originates from adjacent or nearby eroding headlands and beaches. This

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material should be used for beach nourishment, dune reconstruction, or other useful shoreline enhancement or restoration projects, rather than removed from the littoral system which depends on the sand. Clean dredged material is also needed for capping polluted sediments disposed of offshore, but no reliable supply of sand is readily available for this purpose. Project sponsors in Westchester County, for example, must rely on capping material from a single source in Connecticut, which controls supply and cost.

Improved dredging coordination could take advantage of opportunities to resolve such problems as: the lack of clean spoil for beach and dune restoration projects, the lack of suitable material to cap polluted sediments, and excessive costs for testing and monitoring. Costs could be reduced by using equipment and conducting monitoring and testing for multiple dredging and disposal projects located in close proximity to each other at one time, rather than conducting projects separately at different times. Coordinating dredging and disposal projects would also minimize long-term resource impairments resulting from multiple dredging projects spread out over long periods of time. Reducing the number and long-term severity of multiple event projects would minimize the cumulative and secondary impacts within harbor areas and offshore disposal areas.

When undertaking dredging operations, the Corps of Engineers incorporates the least costly method of dredge material disposal into the design of a dredging project, often resulting in the disposal of dredged material offshore for no useful purpose. In many instances, the least costly method of clean dredged material disposal is likely to be the use of the material for beach nourishment in areas near the dredging project or stockpiling the material for capping contaminated material from other projects requiring open water disposal. Since most dredging projects in the Long Island Sound region involve the dredging of state- or town-owned underwater lands, the dredged material should be used for public uses such as beach nourishment along publicly owned shorelines, or, where this is not feasible, sold to help offset the cost of the dredging project. To ensure that clean dredge material is put to beneficial use for projects such as beach nourishment and capping of polluted sediments, locations should be identified where clean dredged material can be stored that are near shoreline areas in need of nourishment or restoration.

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Chapter 5

SPECIAL MANAGEMENT AREAS

Wise land use planning, environmental resource management, and targeted public investments can foster the growth of a wide range of economic activities at appropriate locations, while at the same time protecting and restoring sensitive areas. Without careful planning, the finite resources of the Long Island Sound coast cannot continue to absorb additional development and still meet the needs of future generations for open space, clean beaches and water, wildlife habitats, and agricultural lands. The designation of Maritime Centers, Areas for Concentrated Development, and Outstanding Natural Coastal Areas is a primary means of ensuring a balanced and wise use of coastal resources and a more efficient use of limited local, state, and federal dollars.

Maritime Centers are designed to focus on the needs of the working coast and set priorities for state investment in the coastal area to ensure the effective and efficient operation of water-dependent commercial and industrial uses. State investments in Maritime Centers, combined with various incentives and regulatory streamlining, will encourage the development of new working coast uses within, rather than outside, Maritime Centers. The dispersed development of new working coast uses outside Maritime Centers would be likely to have more significant adverse impacts on the environment and established residential communities than will the concentration of working coast uses in Maritime Centers.

Areas for Concentrated Development are designated to set priorities for state investment in the coastal area for public and private development projects to restore and revitalize waterfronts or areas near the waterfront that have been previously developed and are now underutilized or in a deteriorated condition. Establishing investment priorities will encourage the consolidation of major new growth in existing centers to minimize urban sprawl, protect unspoiled areas, and provide new public amenities.

Within Outstanding Natural Coastal Areas, priorities will be set for state agency efforts to protect, enhance, and restore areas that contain significant coastal resources that are most sensitive to development. Outstanding Natural Coastal Areas are not meant to duplicate existing resource designations, but to identify areas that should be granted priority protection.

This chapter identifies and describes Maritime Centers, Areas For Concentrated Development, and Outstanding Natural Coastal Areas in the Long Island Sound region. The areas that are identified are considered a starting point and are not meant to constitute a comprehensive list. Additional areas are likely to be recommended by local and state agencies. A nomination process has been established for consideration of additional area designations.

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MARITIME CENTERS

Working coast uses and businesses share a common trait—they require a location on the shoreline to function or they depend on harvesting living or mineral resources in coastal waters. For the Long Island Sound Coastal Management Program, the working coast is described as locations where: individual public or private marinas, yacht clubs, and boat yards exist; concentrations of commercial or recreational fishing vessels exist; petroleum products, aggregates, or other waterborne commerce are imported or exported; or ferries arrive or depart from the shore. Dredging is an important activity that occurs in channels and basins throughout the Sound to ensure safe navigation and anchorage in Maritime Centers. The locations of these uses are shown on map 14.0.

It is critical to maintain and strengthen the working coast. Chapter 5, The Working Coast, established that the working coast is vital to the economic health of the region, generating billions of dollars for the regional economy. The economic contribution of the working coast could be improved, if the problems encountered by water-dependent businesses that significantly impair their ability to function were better understood and addressed by state and local agencies.

ENSURING THE FUTURE OF THE WORKING WATERFRONT

There are approximately 200 working coast uses located along the Long Island Sound shoreline. Nearly two-thirds of these uses and activities are clustered in sheltered bays and harbors that have historically been developed with water-dependent commercial and industrial uses. Although they comprise less than 5 percent of the 304 miles length of New York's Long Island Sound shoreline, these sheltered bays and harbors, or Maritime Centers, are essential for waterborne commerce, recreation, and the state's transportation system.

Major challenges face all working coast uses in varying degrees, including competition for space on the waterfront and the water, inadequate or deteriorated coastal infrastructure, impacts of regulation and taxation, degradation of coastal resources, lack of public awareness of working coast uses and businesses, and changing markets and business climate. The designation of Maritime Centers is a means to address these challenges and will have significant and substantial benefits.

Maritime Centers will reinforce the Sound's maritime heritage and its associated economic and cultural benefits by ensuring the effective and efficient operation and expansion of water-dependent commercial and industrial uses. Maritime Centers will protect existing water-dependent uses and necessary land-based support facilities and will help reserve underutilized waterfront commercial land to accommodate future growth of water-dependent uses. This can be achieved primarily through state and local policies and local zoning that reduce competition for commercial waterfront land from non-water-dependent uses. A priority in each Maritime Center will be developing Local Waterfront Revitalization Programs that give preference to water-dependent commercial and industrial uses to minimize competition with non-water-dependent uses.

Maritime Centers will foster effective regional growth management in the Long Island Sound region by directing the growth of water-dependent commercial and industrial uses to commercially developed harbors, while ensuring the protection of natural resources and residential communities. Siting new water-dependent uses in areas already developed with commercial uses will ensure a degree of compatibility with existing harbor uses. It will also ensure the long-term strength of water-dependent uses, as well as the long-term preservation

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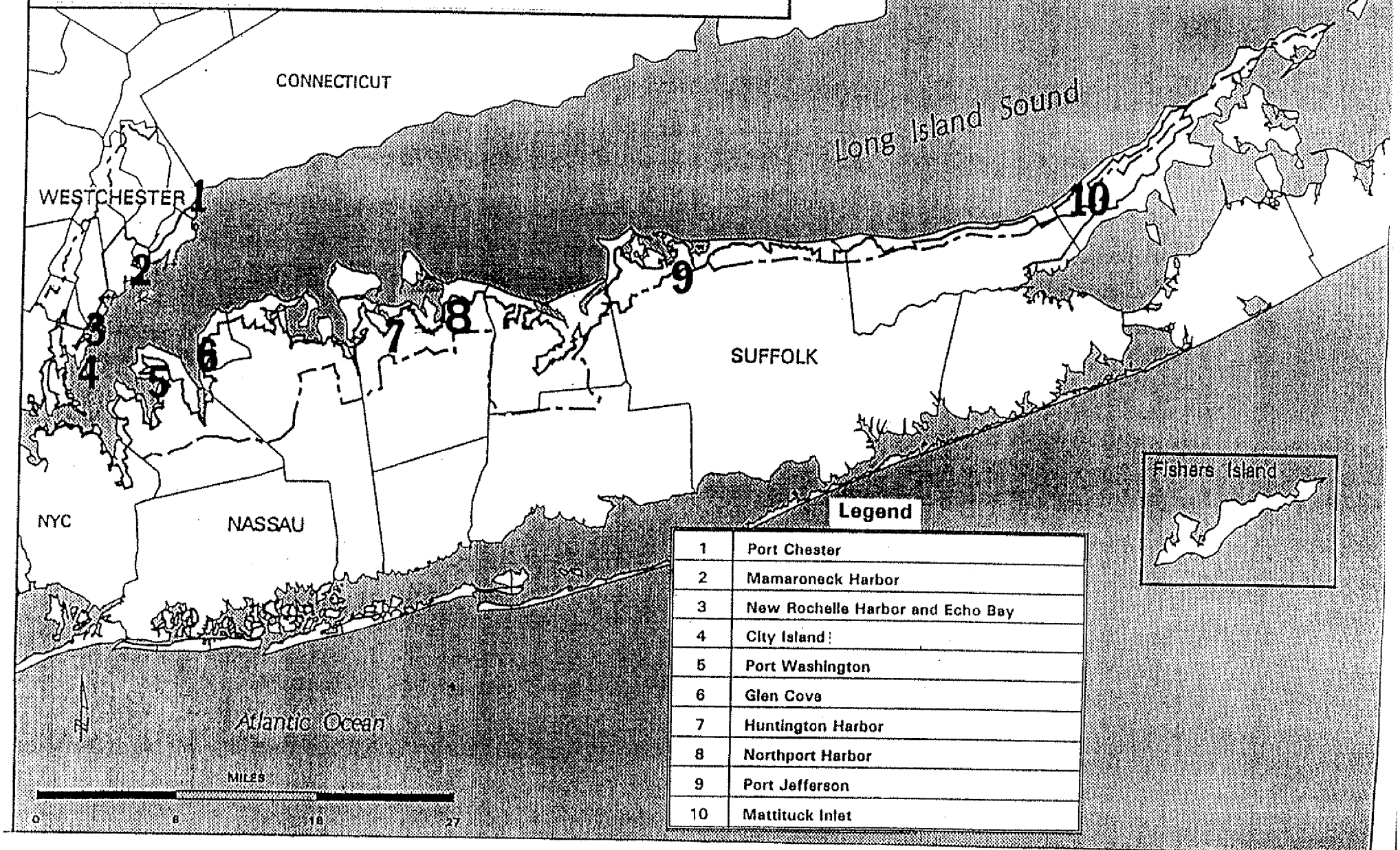
Maritime Centers

MAP 14.0



Legend

1	Port Chester
2	Mamaroneck Harbor
3	New Rochelle Harbor and Echo Bay
4	City Island
5	Port Washington
6	Glen Cove
7	Huntington Harbor
8	Northport Harbor
9	Port Jefferson
10	Mattituck Inlet

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of the economic, natural, and maritime values of the Sound region.

By establishing Maritime Centers as areas where state and local governments desire commercial and industrial water-dependent uses and activities, governments can make the regulatory process more predictable and less onerous. Increased predictablity in governmental decision-making will allow the private sector to invest in projects and developments with greater confidence and less cost. The regulatory process will become less reactive and more proactive, since Maritime Centers will represent—to regulators, investors, and the public—areas that are suitable and appropriate for warking coast uses.

By targeting and directing the growth of water-dependent commercial and industrial uses in Maritime Centers, government will more fully use existing public investments in waterfront infrastructure. By identifying Maritime Centers as targets for state investment assistance, government also will be able to better plan improvements for inadequate or deteriorated coastal infrastructure, such as navigation channels, piers, bulkheads, boat ramps, water and sewer lines, and pumpout stations. This infrastructure, which is often too expensive for water-dependent businesses to maintain or provide, is necessary to sustain water-dependent uses and improve the quality and attractiveness of the working coast. Establishing Maritime Centers will also better enable the public sector to target existing economic assistance programs to strengthen the region's waterfront economy.

With government encouraging the growth of water-dependent commercial and industrial uses in Maritime Centers, the quality and value of natural resources outside of Maritime Centers will be better protected from physical disturbances and the introduction of various pollutants associated with commercial or industrial shoreline activity, Adverse effects, including secondary and cumulative impacts, associated with intensive vessel activity and commercial shoreline development, such as impairments to wetlands, wildlife habitaits, shellfish, water quality, and other natural resources, will be avoided. Dredging to create or maintain channels for large vessels will not be necessary, except in very limited and specific circumstances where water-dependent uses have specific siting needs, The volume of dredged material in the region and the attendant problems will be reduced.

To ensure that environmentally responsible growth and redevelopment occurs in Maritime Centers, environmental standards will be as rigourous and thorough as they would be for projects outside Maritime Centers. However, based on specific, state approved management plans for Maritime Centers, the review process may be shortened for water-dependent uses and activities that are consistent with the Maritime Center plan, since there will be the presumption that the use is compatible with the harbor location.

Goal and Objectives

The goal of designating Maritime Centers is to ensure the long-term strength of commercial and industrial water-dependent uses, as well as the long-term preservation of the economic, natural, and maritime values of the Sound region.

To accomplish this goal, specific objectives will be established for each designated Maritime Center within the framework of the following overall objectives for Maritime Centers:

- Protect and maintain existing commercial and industrial water-dependent uses and allow these uses to expand within well-defined parameters.

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- Promote and facilitate the development of new commercial and industrial water-dependent uses, giving preference to the redevelopment of underutilized sites.

- Ensure proper siting of commercial and industrial water-dependent uses within Maritime Centers and reduce conflicts between commercial and industrial water-dependent uses and other uses.

- Facilitate appropriate private development that can help finance public improvements.

- Provide infrastructure improvements necessary to sustain existing commercial and industrial water-dependent uses, support new commercial and industrial water-dependent uses, and improve environmental quality.

- Maintain or improve environmental quality in Maritime Centers and preserve and enhance the unique, historical character of the maritime community.

It should be noted that while appropriate areas for the development of new water-dependent uses may exist outside Maritime Centers, water-dependent commercial and industrial uses will be discouraged from siting outside Maritime Centers. These uses should locate outside of Maritime Centers only if the use has unique siting requirments that cannot be met adequately in a Maritime Center and all potential significant impacts are mitigated.

In addition, designating commercially developed harbors as Maritime Centers does not imply that there is an abundance of undeveloped waterfront properties available for the growth of new waterfront-dependent uses. Rather, in many harbors, there are only significant opportunities for development on underutilized waterfront properties. Underutilized waterfront properties may be currently developed, but contain vacant or deteriorated structures; may be partially developed, but have additional development potential; or may be developed with an inappropriate or nonconforming use and could be redeveloped with a maritime use. Preference should be given to promoting and faciliting the development of new water-dependent uses on such underutilized waterfront properties in Maritime Centers.

Definition and Criteria for Designation of Maritime Centers

The state's purposes in designating Maritime Centers are to protect existing water-dependent uses, foster the development of new water-dependent uses in appropriate locations where growth opportunities exist, protect and ensure the wise use of underutilized commercial waterfront land that is suitable for water-dependent uses, and ensure the efficient and effective operation of water-dependent uses. Water-dependent uses have unique siting requirements, including adequate upland and in-water infrastructure, water and land side access, and adequate hydrologic conditions. It is important to protect developed and underutilized waterfront commercial property suitable for water-dependent uses, since there are so few waterfront sites that meet these requirements in the Sound region.

A Maritime Center is defined as:

> a discrete portion or area of a harbor or bay that is developed with, and contains concentrations of, water-dependent commercial and industrial uses or essential support facilities, where the harbor or bay area is a center for waterborne commerce, recreation, or other water-dependent business activity and is an important component of the regional transportation system, and where the harbor or bay area is among the most suitable and appropriate locations on the Sound

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coast for expansions of existing, or the development of new, water-dependent commercial and industrial uses.

The following criteria are used to identify Maritime Centers:

- concentration of large and intensive water-dependent commercial or industrial uses
- sheltered locations and suitable hydrologic conditions, such as sufficient water depth and good flushing
- sufficient water depths, navigation channels, anchorage and turning basins, piers and docks, and land-based infrastructure essential for the operation of water-dependent commercial and industrial uses exist or can be provided more easily and at less cost
- the physical conditions necessary to meet the unique siting and operational requirements of most water-dependent commercial and industrial uses that ensure the efficient and effective operation of water-dependent uses
- close proximity to central business districts where commercial uses can be located that are inappropriate for siting on the waterfront, but are complementary or supportive of water-dependent uses
- absence of high value natural resources, such as beaches, dunes, or bluffs; wetlands; shellfish beds, bird habitat or other fish and wildlife habitat; or exceptional surface water quality.

Long Island Sound's Maritime Centers

Ten Maritime Centers have been identified along the Sound coast. Summary descriptions, which include management objectives and a description of project and procedural actions to achieve the objectives, are provided for the Maritime Centers of Mamaroneck Harbor, Huntington Harbor, Port Jefferson, and Mattituck Inlet. These descriptions have been prepared based on consultations with officials from municipalities where the Maritime Centers are located. Abbreviated descriptions are provided for the Maritime Centers of Port Chester Harbor, New Rochelle Harbor-Echo Bay, City Island-East Bronx Shore, Port Washington, Glen Cove Creek, and Northport Harbor. As summary descriptions are prepared for these Maritime Centers, they will also be included in the Long Island Sound Coastal Management Program.

Mamaroneck Harbor

Mamaroneck Harbor is located on the north shore of the western portion of Long Island Sound in the Village of Mamaroneck, Westchester County. It is one of the most crowded and intensely used harbors on Long Island Sound. The harbor is located in the middle of one of the largest cruising and sailing areas on the northeast coast of the United States.

The harbor is comprised of a northern inner and southern outer harbor area. The outer harbor is a fairly wide embayment along Long Island Sound, surrounded primarily by residential development and private yacht and beach clubs. The inner harbor area narrows and splits into two branches that lead into two anchorage basins on the east and west sides of a wide peninsula. A federal navigation channel extends from Long Island Sound along the length of the western half of the harbor, becoming two separate channels that lead into the upper reaches of the east and west basins. Both basins are dredged anchorage areas abutting water-dependent commercial, industrial, and public recreational uses. Most of the inner harbor is crowded with vessels on moorings or in slips. Docks are prevalent throughout the harbor, particularly in the inner harbor.

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Water-dependent commercial and industrial uses are concentrated in the east and west basins of the harbor. The village has established three water-dependent use zoning districts centered in areas around the east and west basins and the east side of the harbor. The harbor area is an integral part of the Village of Mamaroneck's central business district. The downtown portion of the central business district contains many retail stores and restaurants and is easily accessible by foot from the harbor.

Water-Dependent Uses

Mamaroneck Harbor provides a full range of support facilities and services for permanent, seasonal, and transient recreational boating. A wide range of water-dependent uses exists throughout the harbor, including public and private bathing beaches, marinas, yacht clubs, boat yards, boat ramps, mooring areas, recreational fishing, occasional commercial shellfishing, and support services, such as docks, vessel waste pumpout and fueling facilities, and marine retail sales. Water-dependent uses throughout the harbor provide several hundred jobs. Water-dependent commercial and industrial uses and related activities contributed an estimated $18,000,000 to the local economy in 1986. Regionally important marine wholesalers are located nearby in New Rochelle.

Marinas, Yacht Clubs, Boat Yards, and Support Services

One municipal marina and boat ramp owned by the Village of Mamaroneck, a commercial marina open to the general public, three commercial marinas that also provide some boat yard services, and four yacht clubs are located in the harbor. The village harbormaster and the local Coast Guard Auxiliary maintain offices at the municipal marina in the west basin. Most of the marinas and yacht clubs utilize the harbor for vessel mooring.

There are three boat yards in the harbor. One of these boat yards is the only fully operational boat yard in the New York portion of Long Island Sound capable of constructing, servicing, and repairing very large luxury recreational and commercial vessels up to 150 feet in length. Many of the boat yards rent or lease vessel slip space and moorings in the harbor.

The harbor area contains twenty marine retail support services, including a bait and boat fishing station and mooring contractors.

Commercial Vessel Docking and Mooring

Commercial vessels used by marine contractors, such as work boats and barges, are docked at various marinas and boat yards in the east and west basins. The majority of these vessels are docked in the west basin. One barge is kept at a large private dock adjacent to a residential area on the east shore of the east basin. Some commercial vessels, such as small harbor tugs and mooring barges, are occasionally moored in the east basin. Commercial vessels also are moored in the east basin near Derecktor's shipyard when they are being serviced at or used by the shipyard. One lobster boat docks at a private commercial facility on the west side of the west basin.

Commercial Shellfishing

Although the entire harbor is uncertified for shellfishing, it does support a commercial hard clam shellfishery. Hard clams are commercially harvested during state-approved transplants to certified areas outside of the harbor, where they are cleansed, reharvested, and marketed, or kept in field plots for use as spawner stock.

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Recreation

Unlike many Long Island Sound harbors, nonresident anchoring or mooring is not prohibited in the harbor, even though mooring or slip space is at a premium throughout the harbor. The village encourages the use of the harbor by transient vessels and supplies free short-term docking at a village dock in the east basin near the central business district for transient boaters, who need supplies or wish to visit restaurants and shop in and near the central business district. There is a high demand for public transient vessel docking.

During the height of the boating season, the harbor is one of the most crowded and intensely used recreational boating harbors in the Long Island Sound region in New York. Approximately 1,700 vessels on moorings or in slips use the harbor. The inner harbor is filled to capacity with moored vessels, resulting in high demand for moorings and slips. During the height of the boating season, some moored vessels directly abut and occasionally lie within the lines of the harbor's main channels. Some space exists in the outer harbor for additional moorings.

Docks are prevalent throughout the harbor. Most are concentrated in the inner harbor and its east and west basins. Some docks and docked vessels occasionally lie within the lines of and directly abut the east and west basin channels and anchorage areas. There is very little room for navigation in both the west and east basins, except within the west basin channel itself or informal fairways adjacent to the east basin channel and anchorage area.

The harbor's main channel, basin channels, and anchorage basins generally have sufficient depths to support existing vessel traffic and water-dependent uses. However, northern portions of the east basin and its channel are filled with fine sediment from upland runoff. Most sedimentation occurs in the east basin and channel adjacent to Route 1. Although sedimentation is a problem throughout the harbor, the problem is greatest where it interferes with navigation channels and basins adjacent to water-dependent commercial, industrial, and recreational uses.

Recreational fishing is conducted from shore, docks, and boats throughout the harbor. Most shore-based fishing is from Harbor Island Park. Many of the vessels moored, in slips, or launched from ramps in the harbor are used for recreational fishing in Long Island Sound. A few party and charter boats kept in the harbor provide recreational fishing and sport diving cruises throughout Long Island Sound.

A village bathing beach is located at the south end of the Harbor Island Park peninsula. An in-water boom has been installed around the bathing area to prevent pollutants and debris from the harbor from entering the bathing area after storm events and sewage treatment plant overflows or malfunctions. A number of yacht and beach clubs provide bathing areas within the harbor.

For public safety purposes, the village regulates SCUBA diving within the harbor. Diving is prohibited throughout the harbor except by special permission from the village.

Public Access

The harbor's shoreline is highly developed, physically blocking access to much of the harbor from shore. Physical access for the general public to the harbor from land is provided at Harbor Island Park, a 44-acre municipal park between the harbor's east and west basins. The park contains playing fields, a municipal marina and transient dock and boat launch facilities, a vessel waste pumpout facility, offices for the Harbormaster and Coast Guard

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Auxiliary, a village bathing beach, restroom facilities, picnic areas, a fishing pier, and extensive parking areas.

Approximately 66 conveyances of state-owned underwater or formerly underwater filled lands have been made throughout the harbor in the form of grants, leases, or easements. Of these conveyances, 230 acres were grants and 13 acres were leases or easements from the state.

Infrastructure

The harbor, including its water-dependent uses and transportation network of navigation channels and basins, is an integral part of the village's central business district. The central business district is within walking distance of the harbor and contains a number of restaurants and other retail businesses. Activities in the harbor and activities in the central business district are supportive of each other.

There is sufficient roadway and navigation infrastructure to support water-dependent uses in and around the harbor. The harbor is bounded on the north by the Old Boston Post Road (Route 1). Harbor Island Park, which separates the harbor's east and west basins, provides sufficient parking for recreational uses in the park. Public on-street and off-street metered parking exists throughout the area adjacent to the harbor in the central business district. Most residential streets are separated from the harbor by residential development.

Most of the east and west basins are surrounded by bulkheads or stone retaining walls. Many of these structures, particularly those built and maintained by the village, are in various states of disrepair.

Natural Resources

Wetlands and Habitats

Productive vegetated tidal wetlands fringe portions of the harbor. Most vegetated wetlands are on the east side of the harbor in and near Guion Creek and Otter Creek, both of which are small tidal tributaries designated as critical environmental areas. Guion Creek, a tributary to the harbor's east basin, has been dredged from its confluence with the east basin up to South Bay Avenue by the Corps of Engineers as part of the harbor's anchorage basin. Above South Bay Avenue, the creek contains extensive vegetated tidal wetlands. Some vegetated wetlands fringe Guion Creek below South Bay Avenue. A few pockets of vegetated wetlands are scattered throughout other areas of the harbor.

The outer harbor is a fairly productive hard clam shellfishery.

Water Quality

The water quality classification for the harbor is SB, and its highest assigned use standard is primary contact recreation, such as swimming. It often fails to meet the SB water quality and use standards. Urban runoff from heavy rainfalls often results in bathing beach closures.

The Westchester County wastewater treatment plant currently discharges an average of approximately 18 million gallons of treated waste per day into Long Island Sound. The plant was recently modified to provide secondary waste treatment and to move the discharge line from the harbor into Long Island Sound. The plant's State Pollutant Discharge Elimination System permit authorizes the discharge of 20.6 million gallons per day of treated sewage. The plant usually operates within the limits of its permit. Groundwater infiltration and illegal hookups to the plant's sewer lines have been identified as a problem contributing to wastewater plant overloading. The Long Island Sound Comprehensive Conservation and

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Management Plan has identified the need for dentrification modifications to the plant to reduce nitrogen loadings to Long Island Sound.

Municipal stormwater lines discharge directly into the harbor. The stormwater lines are not connected with municipal sewer lines. Stormwater runoff from roadways is not treated prior to its discharge in the harbor. The stormwater lines convey significant quantities of floatable debris, such as street trash, to the harbor, as well as tons of leaves that are swept into residential streets during the fall.

Siltation and sedimentation occur throughout the harbor. Much of the sediment entering the harbor is comprised of fine grained, polluted material from roadways and other upland nonpoint sources. Polluted sediments from the bottom of the harbor are also resuspended in the water column by vessel traffic and settle out in nearshore areas.

There are three vessel waste pumpout facilities in the harbor: on the west shore of the east basin adjacent to the municipal transient vessel dock, at a commercial facility in the west basin, and at Derecktor's boat yard in the east basin. All three facilities are connected to the municipal sewer system. The village has applied for a Clean Vessel Act grant to install a fourth facility at the municipal marina in the west basin.

Summary of Issues and Problems

The issues and problems confronting Mamaroneck Harbor as a maritime center are summarized below and illustrated on map 15.0

Development Constraints

The harbor and its adjacent area are already completely developed. Water-dependent uses fully occupy space in areas zoned for water-dependent uses. The remainder of the areas surrounding the harbor are developed with residences and public parkland. There are very few opportunities for new water-dependent uses in new locations. There may be potential for some limited development in areas currently zoned for water-dependent uses or within certain portions of Harbor Island Park. Space within the harbor is almost fully occupied by vessels on moorings or in slips, docks, and floats, although there is some limited space available for minor dock expansions or reconfiguration. There is space within the outer harbor for additional vessel moorings, but this area is distant from the inner harbor, support facilities, services, and the central business district. However, transport to and from moored vessels in the outer harbor could be provided by a private water taxi service.

Given the limited amount of available space adjacent to the harbor area for new water-dependent uses and the importance of water-dependent uses to the economic viability and character of the harbor and the village's central business district, any development or redevelopment efforts in these areas should be directed toward water-dependent uses or uses that support water-dependent uses.

The county wastewater treatment plant does not denitrify wastes. Additional wastes would increase nitrogen loadings to the harbor and Long Island Sound. The Long Island Sound Comprehensive Conservation and Management Plan has recommended dentrification modifications to the plant. Denitrification modifications would decrease the volume of waste treated by the plant and may require a physical expansion of the plant. Existing site constraints must be considered when denitrification improvements are designed for the Westchester County wastewater treatment plant since physical expansion of the plant would encroach upon and adversely affect public open space and recreational areas in Harbor Island

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15.0 Mamaroneck Harbor Maritime Center

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Park. In addition, enlarging the existing plant would likely be very costly. Thus, improving the capacity of the Westchester County plant through off-site structures should be considered. All practical possibilities should be evaluated before a final determination is made regarding increased nitrogen removal capacity.

Commercial and Industrial Water-Dependent Uses

Public and private maintenance dredging and dredge spoil disposal and the ability of existing water-dependent commercial and industrial uses to expand or reconfigure in-water structures in response to changing demands for different dock configurations are two of the most significant issues affecting water-dependent commercial and industrial uses in the harbor. The manner in which water-dependent uses are assessed for tax purposes is also a major issue.

Boat yards and marinas are dependent upon sufficient depths in approach channels and basins to support navigation to and from the facilities and for in-water uses and structures. These publicly and privately dredged channels and basins require occasional maintenance dredging. Most dredged material in channels and basins in the harbor consists of fine grained, contaminated sediments that originate from upland sources. State and federal regulatory agencies require material testing and monitoring prior to disposal of contaminated sediments. Projects that are not conducted by the Corps of Engineers require capping of this material with clean sediment when disposed offshore. Finding clean capping material, developing affordable testing programs, and developing appropriate and affordable spoil disposal sites for this material are extremely difficult.

Public and private dredging and spoil disposal activities are not coordinated among water-dependent uses within the harbor or among private and public entities. The multiple dredging projects that result exacerbate cumulative water quality and resource impairments in the harbor and around spoil disposal sites. The lack of coordination also results in an extremely expensive, time consuming, and onerous regulatory scenario that hampers routine maintenance dredging.

Although some marinas and boat yards occupy upland areas and use this space for vessel storage and maintenance activities, few of the facilities have sufficient upland space to expand. Most expansions are in-water, consisting of new docks and floats, or rearrangements of these in-water structures. In-water structures are an integral component of all marinas and boat yards in Mamaroneck Harbor. Facilities must often move, relocate, reconfigure, or expand in-water structures in response to changing market demands. There is a need to allow marinas and boat yards to reconfigure and expand in the harbor adjacent to their upland sites; however, given the lack of space in appropriate locations in the harbor, space within the harbor needs to be allocated consistent with the size and use of adjacent areas.

The Village of Mamaroneck's zoning prohibits non-water-dependent uses in the General Marine-Commercial (MC-1) district; allows non-water-dependent uses at street grade adjacent to Route 1 and prohibits non-water-dependent uses below street grade adjacent to the harbor in the Central Marine-Commercial (MC-2) district; and prohibits all uses except membership clubs, such as beach, golf, country, and yacht clubs, and certain accessory uses in the Marine Recreation (MR) district. All three of these districts comprise the village's Marine Zone, which was developed to maintain and protect important water-dependent uses. In the past, boat yards and marinas in the Marine Zone had been assessed for tax purposes at rates for higher value uses, which are prohibited in the Marine Zone. This inequity was an unfair tax

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burden that needed to be resolved in order to improve the economic viability of water-dependent uses. The village is now in the process of reassessing water-dependent businesses for their value as water-dependent uses and issuing tax refunds as appropriate.

Navigation and Docking

The inner harbor is crowded with moored vessels. Many docks and other structures project into the harbor, and navigation channels are narrow. There are no designated safety buffers between channels and moored vessels, bathing beaches, docks, or other structures.

The last dredging projects in the harbor conducted by the Corps of Engineers were the entrance channel in 1965, the west basin in 1981 and its channel in 1966, the east basin channel in 1965, and the east basin in 1966. These channels and basins, which are part of the harbor's and the state's transportation network, need to be maintained at sufficient depths. Basins adjacent to marinas, boat yards, and yacht clubs also need to be maintained.

There is a high demand for additional transient docking in the east basin near the entrance to Harbor Island Park, adjacent to the village's central business district. Although there are many public and private docks and floats throughout the harbor and the village has installed a transient dock in the east basin near Route 1, the demand for transient docking remains high.

Public Access and Underwater Lands

Public access from the shore to the harbor is generally limited to Harbor Island Park. Access to the harbor from the east shore is very limited, because the shoreline is fully developed with residences and private yacht clubs.

The state has issued approximately 66 conveyances of public rights, title, and interests in underwater lands to various upland property owners. Many of these conveyances have limited or extinguished public trust rights and interests to portions of the harbor, resulting in a significant loss of public access to and public trust rights and interests in significant portions of the harbor. In some instances, recipients of these conveyances have prohibited public use of these lands for anchoring, mooring, or other uses. Although an underwater lands study in the harbor has been conducted that identified these conveyances, there are unresolved issues that need to be addressed, such as: the extent to which public trust rights and interests in these lands have been limited or extinguished; the extent of those rights remaining; the rights of the adjacent upland owners and those who were the recipients of the conveyances; what conditions, if any, were included in these conveyances; and whether or not the conveyances remain valid. There may be several opportunities to expand public access to and use of these lands where conveyances are no longer valid, or where public trust rights and interests remain.

Water Quality and Habitats

Urban runoff upstream of the harbor—both within and outside of the village, as well as adjacent to the harbor—and concentrations of vessels and marinas are the largest contributors to water quality impairments. Suspended sediments in the water column adversely affect the harbor's water quality and vegetated and unvegetated wetlands. The harbor's sediments contain concentrations of pollutants, including heavy metals (primarily from roadway runoff) and marine related activities at marinas, boat yards and yacht clubs, and vessels. Floatable debris, such as street litter, enters the harbor from the stormwater system. Tons of leaves swept into streets each year also enter the harbor through the stormwater system and settle

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out in the east basin, resulting in organic loadings to the harbor and navigation impairments in the east basin and channel.

There is an opportunity to provide partial treatment of runoff draining from Harbor Island Park through and over the stone retaining wall in the west basin. Sedimentation in the west basin channel could be mitigated by establishing vegetated wetland buffers in the intertidal area between the basin channel and the retaining wall on the east side of the basin. This opportunity also exists in the intertidal area between the retaining wall on the east side of Harbor Island Park and the east basin channel. Vegetated wetlands could also be established on the east shore of the east basin to reduce sedimentation in the harbor from upland runoff.

The Long Island Sound Coastal Management Program, the preliminary vessel waste pumpout plan in the state's Clean Vessel Act grant application, and the Long Island Sound Comprehensive Conservation and Management Plan have all identified the need to designate the harbor a vessel waste no-discharge zone. The village has prepared material for a state petition for a determination by the EPA Administrator that there are sufficient vessel waste facilities in the harbor to support state designation of the harbor as a vessel waste no-discharge zone.

Recreation

Harbor Island Park and the harbor provide significant water-dependent and non-water-dependent recreation including: swimming areas, marinas and mooring areas for recreational boating, and fishing; nature observation and other passive water-related recreation, such as walking; and non-water-dependent recreational uses, such as playing fields for field sports. There is a high demand for additional transient docks for recreational boating.

Swimming is a significant water-dependent recreational use in the harbor; however, stormwater runoff after heavy rainfalls often results in beach closures at the municipal bathing beach and at private yacht and beach clubs. This is a major impairment to the harbor's assigned water quality use classification.

Access to the harbor for passive recreational uses at locations other than Harbor Island Park is physically restricted by existing development patterns, but could be improved at street ends or other areas, where public rights-of-way from upland areas could be established. Public access to and use of the harbor is limited in some instances by state grants, easements, or leases to adjacent landowners. The extent to which these conveyances impair public access to and use of underwater lands is not known. Some of these conveyances may no longer be valid. Where they are no longer valid, or where it can be determined that public trust rights and interests remain, there may be opportunities to increase public access to and use of the harbor.

Infrastructure and Development Constraints

All of the upland adjacent to the harbor is currently utilized, and most of the nearshore area within the harbor is developed with docks, vessel moorings, swimming areas, navigation channels, or other uses. There is no available space for new upland or in-water development. The only substantial open space within the harbor area is within the outer harbor and within Harbor Island Park.

Many of the wood bulkheads and stone retaining walls in the east and west basins are in disrepair, resulting in sedimentation in the harbor, slumping of adjacent upland, public safety hazards, and unattractive views. These structures need to be repaired or replaced.

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Given these constraints and the lack of opportunities for new uses, there is a need to maintain the economic viability of water-dependent uses and recreation in the harbor area. Economic viability can be strengthened by promoting efficient harbor operations.

Redevelopment Potential

Although limited, there are opportunities for the development of new water-dependent uses. Private beach and yacht clubs currently exist in areas zoned MR (Marine Recreation). The existing MR zoning limits all uses in the district to nonprofit membership clubs, such as beach and yacht clubs, and certain accessory uses. The MR zoning could be amended to allow water-dependent commercial uses in the MR district.

Summary of Overall Objectives

1. Protect and maintain existing water-dependent uses in their present locations, and improve conditions so that they can operate cleanly and more efficiently. Where water-dependent uses are principal uses, allow limited non-water-dependent uses that support the water-dependent uses. Allow private nonprofit uses to change to water-dependent commercial uses.

2. Maintain the harbor's existing navigation channels and basins at adequate depths to support water-dependent uses.

3. Prevent impairments to navigation where necessary by relocating, reconfiguring, and limiting in-water structures to well defined perimeters to prevent further overcrowding and prevent impairments to navigation. Prevent in-water structures or the anchoring or mooring of vessels or floats in channels, bathing areas, or other inappropriate areas.

4. Reduce use conflicts and provide safety buffers between bathing areas and between structures or moored vessels and channels or fairways.

5. Provide necessary infrastructure improvements to sustain existing development, improve water quality, and maintain navigation in the harbor (such as wastewater treatment plant modifications, stormwater runoff control, vessel waste pumpout facilities, navigation channel and basin dredging, and bulkhead maintenance).

6. Coordinate and facilitate public and private maintenance dredging and dredge spoil disposal activities.

7. Maintain and, where appropriate, increase public access to public lands and waters. Prevent the loss of open space and recreational opportunities. Maintain and improve Harbor Island Park for public access and recreational activities. Increase public access to the harbor from land, and improve access from the harbor to the central business district.

8. Maintain the harbor's SB water quality classification and improve water quality to support primary contact recreation.

9. Protect the village's historical character by promoting commercial and recreational uses in the village that are compatible with community character.

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Actions Needed

A harbor management plan is being developed as a component of the Village of Mamaroneck's approved LWRP. The harbor management plan is being designed to achieve the preceding objectives and will include priority actions, such as the following projects and procedural recommendations:

Projects

1. Navigation (also see procedural item #4, Water Quality) - Develop a coordinated, public and private dredging, dredged material testing and monitoring, and dredged material disposal plan for the harbor that includes appropriate offshore and, where feasible, upland dredged material disposal sites. Dredge the existing federal navigation channels and basins and dispose of dredged material in a manner consistent with the dredging plan (also see procedural item #1, Regulatory Simplification). (Objectives 1,2,4,5,6,7)

2. Water Quality - Provide denitrification modifications to the Westchester County wastewater treatment plant (also see Infrastructure project #5). Existing site constraints must be considered when denitrification improvements are designed for the Westchester County wastewater treatment plant. Enlarging the existing plant would likely be difficult and costly, and an enlargement of the existing plant would further impact Harbor Island Park. Thus, improving the capacity of the Westchester County wastewater treatment plant may require off-site treatment. All reasonable alternatives should be evaluated before a final determination is made regarding increased nitrogen removal capacity.

   Retrofit the existing stormwater system to treat roadway runoff. Provide drainage improvements to treat runoff from Harbor Island Park. Establish vegetated wetlands on the north side of the west basin, the east side of Harbor Island Park, and south of Guion Creek. Maintain buffers around Guion and Otter creeks and along the east shore of harbor. Initiate street sweeping and maintain catch basins. Existing anti-litter programs and regulations should be enforced. Where appropriate, focused programs to remove litter should be instituted and maintained. Develop an intermunicipal approach to address stormwater runoff originating from upstream municipalities. Provide additional vessel waste pumpout and dump stations using Clean Vessel Act funds. (Objectives 5,7,8)

3. Recreation - Maintain and repair Harbor Island Park's roadway and parking areas; repair bulkheads and retaining walls; repair and maintain public restrooms and vessel waste facilities, and provide additional vessel waste facilities; and provide additional short-term public docking facilities in the east basin. Designate seaward limits of bathing areas, open space, and safety buffers between bathing areas, channels, fairways, and in-water structures. Provide access from street ends to the harbor. (Objectives 1,2,3,4,5,7,8)

4. Infrastructure - Reconstruct and repair deteriorated public bulkheads and retaining walls. Maintain navigation channels and basins at suitable depths. Provide wastewater treatment plant denitrification modifications. Retrofit the stormwater drainage system to treat runoff prior to discharge in the harbor. Provide additional public docking facilities. (Objectives 1,2,5,7,8)

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5. Public Access - Review grants, leases, or easements in and to underwater and formerly underwater lands to determine where conditions of the grants, leases, or easements have and have not been met. Where the grants, leases, or easements are no longer valid, or where conditions have not been met, reassert public rights and interests to those lands for public use, where appropriate, and remove or mitigate obstructions, where appropriate. Provide access to the harbor from street ends and as part of stormwater drainage retrofits, where possible and appropriate. Designate public anchoring and mooring areas and provide additional public docks for transient vessels. (Objectives 3,4,7)

Procedural

1. Regulatory Simplification - Simplify the state and local regulatory process for public and private actions that are consistent with the harbor management plan. Simplify regulatory activities affecting dredging by incorporating the dredging plan identified in project #1 into agency decision-making. Establish seaward perimeters of areas where in-water structures may be placed, moved or modified, and simplify the regulatory process for placing, modifying, or moving in-water structures in these areas. (Objectives 1,2,5,6)

2. Water-Dependent Uses - Maintain the Marine Commercial and Marine Recreation zoning districts to insure that commercial water-dependent uses are not displaced by non-water-dependent uses. Amend the zoning text, where appropriate, to allow limited water-enhanced or non-water-dependent uses that support water-dependent uses. Establish seaward perimeter boundaries adjacent to Marine Commercial and Marine Recreation zones (also see procedural item # 5, In-Water Structures and procedural item #1, Regulatory Simplification). Within these perimeters, allow modifications to docks, floats, pilings, and other in-water structures and allow maintenance dredging consistent with the coordinated dredging plan in project and procedural items #1 without requiring new regulatory permits for minor modifications. Designate offshore limits for public bathing areas. Designate open space and safety buffer areas between bathing areas, channels, fairways, mooring areas, and in-water structures. (Objective 1,2,3,5,6,7)

3. Navigation, Anchoring, and Mooring (also see procedural item #5, In-Water Structures) Designate specific areas for: in-water structures; long and short-term vessel mooring; channels, fairways, and open space; and safety buffer zones adjacent to channels, mooring areas, bathing areas, and in-water structures. Allocate in-water space for mooring areas, in-water structures, and vessel basins consistent with the use of the adjacent upland. (Objectives 1,2,3,4,7)

4. Water Quality - Maintain the harbor's SB water quality classification and use standard for primary contact recreation. Require pretreatment of runoff through existing regulatory programs. Adopt sediment and erosion control standards for existing and new development. Prohibit the dumping or placement of material such as lawn sweepings and leaves onto public streets. Coordinate public and private dredging and dredged material disposal consistent with the plan identified in project item #1, Navigation. (Objectives 1,2,5,6,7,8)

5. In-Water Structures - Establish a seaward bulkhead line for the entire harbor within which filling or bulkheading is allowed, and prohibit filling or bulkheading seaward of this line. Establish a seaward harbor line within which in-water structures are allowed, and beyond which in-water structures are prohibited. Establish in-water perimeter limits

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within the bulkhead and harbor lines consistent with adjacent upland zoning and uses, and allow minor modifications to in-water structures within these perimeter areas. (Objectives 1,2,3,4,7)

6. Harbor Improvement District - Establish a harbor improvement district to provide a funding mechanism for public projects and physical improvements in and adjacent to the harbor, such as: water quality improvement projects; studies; construction and maintenance of parking lots, bulkheads, boat ramp, docks, and vessel waste pumpout facilities; public mooring and anchorage facilities; land acquisition; dredging and dredged material disposal; and harbor management activities, facilities, and equipment. (Objectives 1,2,5,6,7,8)

Huntington Harbor

Huntington Harbor is one of the most important and intensely used recreational boating harbors on Long Island Sound in New York. The harbor is approximately 340 acres in size and is one of four harbors within the Huntington-Northport Bay complex, the largest harbor and bay complex on Long Island's north shore. Almost all of the harbor, except for the extreme northwest portion within the municipal limits of the Village of Lloyd Harbor, is within the Town of Huntington. The upland on the harbor's northeastern shore is within the Village of Huntington Bay.

Residential development surrounds most of the northern portion of the harbor, with interspersed recreational and commercial water-dependent uses. The upland surrounding the southern half of the harbor is where the greatest concentration of commercial and recreational water-dependent and water-enhanced uses is located. The intensely used southern half of the harbor and its upland area are near and are an integral part of the Town of Huntington's central business district; the extreme southern portions are zoned a C-9 Harbor Use District.

The northern half of the harbor supports extensive high value vegetated and unvegetated tidal wetlands and a major commercial shellfishery. The harbor's large watershed is fully developed with a mix of commercial, residential, and industrial uses. During the boating season most of the harbor is occupied by vessels on moorings and in slips. A federal navigation channel runs the entire length of the harbor from Huntington Bay to the extreme southern end of the harbor.

Water-Dependent Uses

The range of water-dependent uses throughout the harbor includes a bathing beach, marinas, yacht clubs, boat yards, a public boat ramp, commercial and recreational fishing and shellfishing, mooring areas, party and charter boats, and support services, such as docks, vessel waste pumpout facilities, fueling, marine sales, and marine insurance brokers. A few docks in the harbor are used by the commercial fishing and marine construction industry.

Marinas, Yacht Clubs, and Support Services

There are seven commercial marinas, two town-owned marinas and a boat ramp, four yacht clubs, and support services, such as boat storage and repair and marine sales and brokerages in the harbor. Some of the marinas provide dockage for small harbor tugs and commercial fishing and marine construction vessels (see commercial vessel docking).

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Commercial Fishing and Shellfishing

The northern portion of the harbor supports an extremely productive commercial shellfishery. In the past four years, approximately 16,000 bushels of shellfish, primarily hard clams, have been harvested during conditional openings or relayed from this area to others, with a retail value in excess of $1,000,000. The offshore commercial fishing industry within the harbor, consisting of several vessels, centers almost exclusively on lobsters, although some trawlers and draggers also operate out of the harbor.

Commercial Vessel Docking and Mooring

Several marinas and private docks provide limited dockage for commercial vessels, such as small harbor tugs, vessels used in marine construction, trawlers and draggers, and several lobster boats. Most are located along West Shore Road, although some are on the east side of the harbor, and one private dock used by commercial fishing vessels is located in the extreme northeast section of the harbor.

Approximately 80 bay boats used to harvest inshore shellfisheries moor along West Shore Road. Many other bay boats moor, use slips, or dock throughout the remainder of the harbor.

Recreation

The harbor is one of the most intensely used recreational boating harbors on the Sound and is a desired stopover for transient recreational vessels travelling throughout the northeast coast. Approximately 655 vessels are on moorings, and approximately 1,100 vessels are in slips at marinas and yacht clubs. The highest concentrations of vessels are in the southern half of the harbor and along much of the length of the harbor's west shore to the municipal boundary of the town and the Village of Lloyd Harbor. Two town-owned marinas are located in the southern portion of the harbor, one adjacent to a small town-owned passive recreation park, and the other adjacent to a town-owned boat ramp and small parking area.

Informal, unsupervised swimming takes place throughout the harbor, except in the extreme southern portions. Several civic associations lease land from the town between West Shore Road and the harbor. The associations restrict the use of these areas to association members. Public restrooms are not provided; therefore, the Suffolk County Department of Health does not allow them to be used as formal swimming and bathing areas.

Gold Star Battalion Beach, a well used town bathing beach, is the only public bathing beach in the harbor, located in the northwest portion of the harbor. The beach has occasionally been closed to swimming, as a result of short-term water quality impairments from runoff after heavy rainfalls and occasional wastewater treatment plant malfunctions. The offshore limit of the swimming area is constrained by moored vessels that are too close to the bathing area, and the floats that define the swimming area occasionally rest on the intertidal area during low tide, limiting opportunities for swimming and bathing. In order to reduce water quality impairments which impair primary contact recreation within the bathing area, a "Gunderboom" is installed around the bathing area during the summer.

Infrastructure

The harbor's watershed is extensively developed. The harbor is supported by extensive roadway infrastructure. Roadways are immediately adjacent to and surround the southern portion of the harbor. Although public and private parking is provided around the harbor, it is inadequate for many water-dependent uses in the southern portions of the harbor because of existing development. The federal navigation channel and basin are sufficient for all uses

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within the harbor. Several public and private bulkheads in the southern portion of the harbor are in disrepair. The town-owned and -operated wastewater treatment plant has a design capacity of 2.5 million gallons per day of sewage, and currently treats approximately 1.9 to 2.0 million gallons per day. The plant can treat up to 5.5 million gallons for brief periods of up to six or seven hours. The plant does not provide denitrification.

Natural Resources

Wetlands and Shellfish

Vegetated tidal wetlands exist along the shore throughout the northern portions of the harbor and fringing much of the length of the southern portions of the harbor on the west shore. The most productive high value vegetated and unvegetated wetlands are located in the northern half of the harbor, primarily along the west shore in the Village of Lloyd Harbor and on the east shore north of Knutson West Marina. Although the entire northern portion of the harbor supports a productive hard clam shellfishery, the most productive areas are in the extreme northwest portion of the harbor and east of the navigation channel. The viability of the shellfishery is dependent upon high water quality and undisturbed vegetated and unvegetated wetlands.

Water Quality

The water quality classification for the entire harbor is SA, and its highest assigned use standard is shellfishing. The harbor fails to meet the SA water quality and use standards, although the northern portions usually meet standards for primary contact recreation, such as swimming. Conditional shellfishing is allowed in the northern portions of the harbor during the winter and early spring, except after a 0.1 inch rainfall within a 24-hour period. Excessive coliform loading after prolonged periods of heavy rainfall during the summer has occasionally resulted in bathing beach closures.

Five vessel waste pumpout facilities are available for public use in the southern portion of the harbor. Three of these facilities are owned by the town and are open continuously from April 1 through November 15 without charge. The other two facilities are privately owned and charge ten dollars per pumpout. An additional town-owned facility is planned near the mouth of the harbor at Castle Cove Marina. Wastes from pumpout and dump facilities are transported to and receive pretreatment and secondary treatment at the town's wastewater treatment plant.

The state, on behalf of the town, submitted a petition to the EPA for a determination that there are sufficient vessel waste facilities in the harbor to support state designation of the harbor as a vessel waste no-discharge zone. The EPA has tentatively determined that there are sufficient facilities available to support such a state designation, which would prohibit the discharge of all treated and untreated vessel wastes into the harbor.

Summary of Issues and Problems

The issues and problems confronting the Huntington Harbor Maritime Center are summarized below and illustrated on map 16.0.

Development Constraints and Potential for Redevelopment

Given the already intensely developed shoreline around the southern portions of the harbor, the limited space between West Shore Road and the harbor, the residential development and parkland surrounding the remainder of the shoreline, and development constraints associated with high natural resource values in the northern portions of the harbor, limited opportunities

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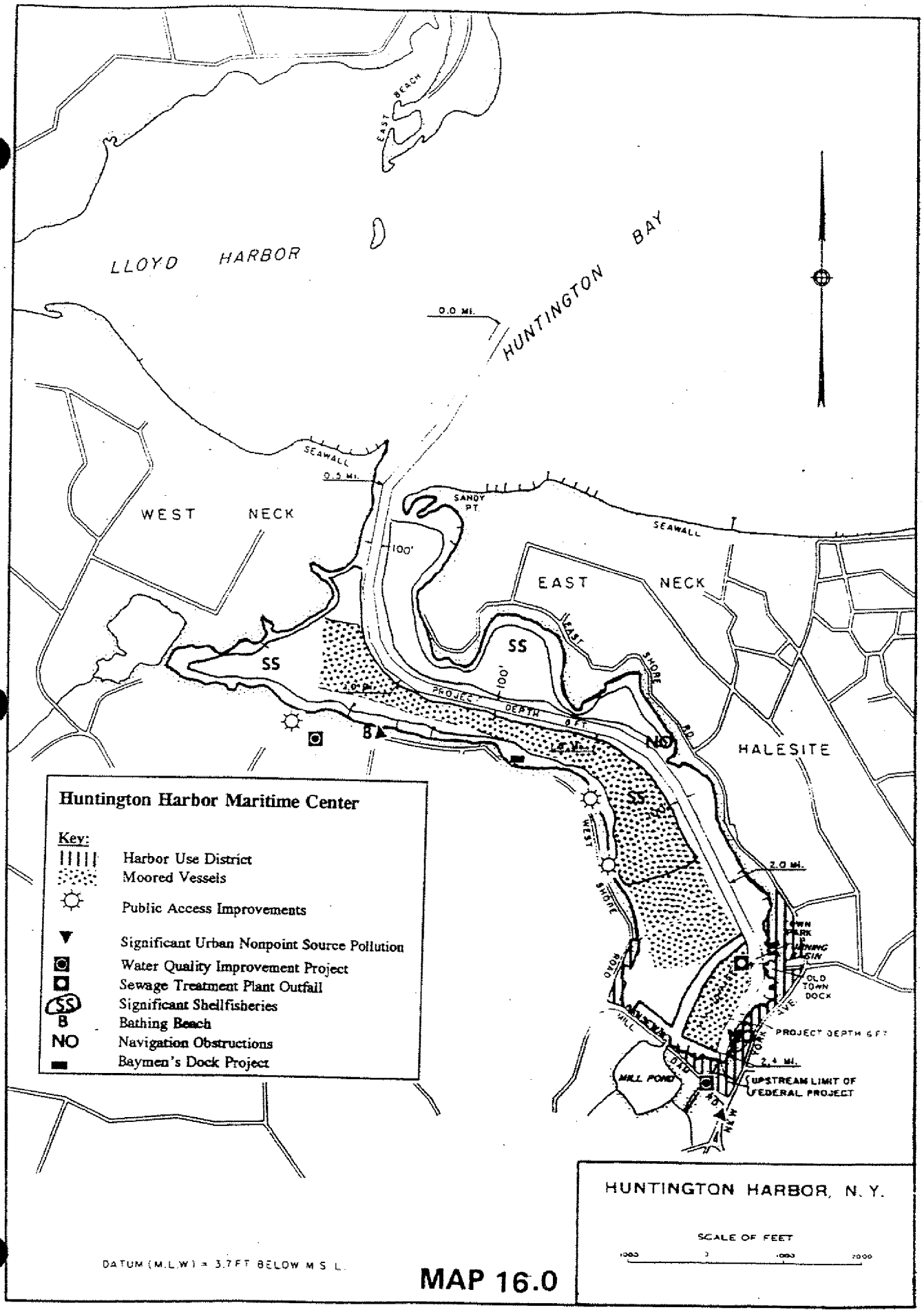
LLOYD HARBOR
HUNTINGTON BAY
EAST BEACH
0.0 MI.
SEAWALL
0.5 MI.
WEST NECK
SANDY PT.
SEAWALL
EAST NECK
100'
SS
SS
EAST SHORE RD.
PROJECT DEPTH 6 FT.
B
NO
HALESITE
SS
WEST SHORE ROAD
2.0 MI.
OLD TOWN DOCK
PROJECT DEPTH 6 FT.
2.4 MI.
MILL POND
UPSTREAM LIMIT OF FEDERAL PROJECT
Huntington Harbor Maritime Center
Key:
Harbor Use District
Moored Vessels
Public Access Improvements
Significant Urban Nonpoint Source Pollution
Water Quality Improvement Project
Sewage Treatment Plant Outfall
Significant Shellfisheries
Bathing Beach
Navigation Obstructions
Baymen's Dock Project
HUNTINGTON HARBOR, N. Y.
SCALE OF FEET
DATUM (M.L.W.) = 3.7 FT BELOW M.S.L.
MAP 16.0

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exist for new commercial water-dependent uses. There is, however, the potential to locate new water-dependent uses in areas where water-dependent uses currently exist, and for redeveloping non-water-dependent uses and sites in the southern portion of the harbor with water-dependent uses. There is also an opportunity to provide for cleaner and more efficient operation of existing and new water-dependent uses and to improve water quality throughout the harbor to increase capacity and economic efficiency.

Commercial Water-Dependent Uses

The existing water-dependent uses in the southern portion of the harbor are consistent with the existing C-9 zoning category; however, the C-9 district also allows non-water-dependent uses, which could displace the important water-dependent uses. Some non-water-dependent uses occupy valuable waterfront space that could be used by water-dependent uses, or by water-enhanced and other uses that support water-dependent uses. Important commercial water-dependent uses elsewhere in the harbor are located in residential zoning districts and, as nonconforming uses, can be displaced easily. There is a need to protect water-dependent uses in the C-9 district and in other areas from displacement.

There are inadequate support facilities, such as loading and unloading docks and parking areas, for commercial fishing and shellfishing. Over 80 baymen currently park their vehicles on the shoulder of West Shore Road. They carry equipment and products across intertidal wetlands and up a steep embankment to and from their vehicles and vessels, resulting in hazardous traffic conditions, natural resource impairments, and inefficient and unsafe operation. The few docks available to the commercial fishing and shellfish industry are nonconforming uses which can be displaced by non-water-dependent uses. A partial solution to this problem, identified by the town, could be acquisition of a marina on the west shore of the harbor, construction of a commercial fishing and shellfishing loading and offloading dock, and designation of the adjacent area for the mooring of commercial fishing and shellfishing vessels. Such a solution would provide some of the support facilities and long-term stability required by the commercial fishing and shellfishing industry.

Navigation

The harbor is extremely congested with moored vessels, moored floats, and in-water structures, primarily from the middle to the southern reaches of the harbor along both the east and west shores and along most of the west side of the harbor. In-water structures extend seaward too close to the channel and mooring areas and, in some cases, are within the lines of the channel. These conditions are unsafe, as are conditions where moored vessels are in close proximity to bathing areas. There is a need to reduce this congestion and the competition for space that it creates throughout the harbor.

Access to Underwater Lands and the Foreshore

A number of leases, easements, and grants to town-owned underwater lands and the foreshore have been issued. Although leases, easements, and grants often retain some form of continued public use of public lands, many of the current holders of these agreements prohibit or prevent public access to and use of these public lands for commercial and recreational fishing, shellfishing, strolling, swimming, and boating.

Physical access is restricted by physical barriers, such as fences built perpendicular and parallel to the shoreline. These physical barriers, such as along West Shore Road, prevent public access across public lands to the harbor and along the shoreline at the water's edge. Docks and bulkheads also limit and prevent access along shoreline.

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Water Quality, Wetlands, and Shellfishing

The harbor fails to meet the SA water quality classification in terms of both water quality and use standards, precluding its assigned use for shellfishing throughout the harbor. This problem is greatest in the northern portions of the harbor, where the most productive shellfishery exists. Urban nonpoint source pollution from the harbor's fully developed watershed, the intense concentration of vessels, and occasional wastewater treatment plant malfunctions are the primary causes of water quality and use impairments. The southern portions of the harbor are where most of the water quality impairments exist, and even if efforts are undertaken to reduce nonpoint source impairments in this area, it is doubtful that water quality will ever be improved to the point where shellfishing will be allowed. In addition, the dredged and intensely developed southern portion of the harbor does not contain or support, nor is it feasible to reconstruct, a habitat conducive to the propagation of shellfish. Winter conditional shellfishing does take place in the northern portions of the harbor, and it may be possible to improve water quality in the northern portion of the harbor to increase opportunities for direct harvesting or additional relays.

The town's wastewater treatment plant contributes an average of 1.9 to 2.0 million gallons of secondary treated waste per day in the southern portions of the harbor.

The biological integrity and high resource values of the vegetated wetlands, which partially support the habitat and shellfishery in the harbor and the entire Huntington-Northport Bay complex, are impaired by sedimentation and physical destruction in many areas. The biological integrity, functions, and resource values of these wetlands are dependent upon an undisturbed condition and high water quality.

Recreation

The harbor itself is extremely overcrowded. There are several use conflicts throughout the harbor, such as those between vessel moorings and bathing at Gold Star Battalion Beach, between vessel mooring and shellfishing, and between recreational vessel docks and navigation.

Coindre Hall, a former estate and private school now owned by Suffolk County, is located on a hillside overlooking the northern portion of the harbor. The estate grounds include a large expanse of open space adjacent to the harbor, a boathouse adjacent to the harbor, and a large dock. There is potential for the adaptive reuse of the portion of the property adjacent to the harbor for waterfront access for passive water-dependent and water-enhanced uses, such as open space enjoyment, fishing, and nature and marine study.

Infrastructure and Development Constraints

The southern portions of the harbor are almost fully developed. There is very little room for new water-dependent uses, or expansions of existing water-dependent uses either in-water or upland, with the exception of the narrow strip of land between West Shore Road and the harbor, and lots that are currently developed with non-water-dependent uses, which could be redeveloped with water-dependent uses. The extremely narrow strip of land between West Shore Road and the harbor, where several small docks servicing commercial vessels exist, provides very little space for any upland uses.

Although the wastewater treatment plant is operating well within its current capacity and could treat additional wastes, additional wastes would increase nitrogen loadings to the harbor, the adjacent bay complex, and Long Island Sound. The Long Island Sound

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Comprehensive Conservation and Management Plan has recommended denitrification modifications to the plant, which would decrease the plant's capacity.

Drainage and flooding problems are extensive around the southern perimeter of the harbor, where shoreline erosion and sedimentation results, where bulkheads are in disrepair, or where the shoreline is unprotected by structures or vegetation. High natural resource values are development constraints throughout the northern portions of the harbor.

Summary of Overall Objectives

1. Protect and maintain existing water-dependent uses in their present locations and improve conditions, so that they can operate cleanly and more efficiently within well defined limits, in order to improve economic efficiency and prevent further impairments to wetlands, water quality, and shellfisheries and to prevent further congestion, use conflicts, and use impairments in the harbor. Limit new or expansion of existing commercial water-dependent uses to the southern portion of the harbor.

2. Prevent impairments to navigation and access to underwater lands and along the shoreline by limiting in-water structures to well-defined perimeters to prevent further overcrowding and prevent impairments to navigation. Prevent in-water structures or the anchoring or mooring of vessels or floats in channels, bathing areas, the most productive shellfishing areas, or in other inappropriate areas. Allocate space for mooring areas and structures consistent with upland use.

3. Assure adequate long-term commercial fishing and shellfishing loading and unloading and vessel mooring.

4. Maintain the current SA classification and use standards for shellfishing and bathing in the northern portion of the harbor outside of the Harbor Use District by improving water quality; improve water quality in the southern portion of the harbor in the Harbor Use District.

5. Preserve and protect the harbor's shellfishery and the habitat that supports it.

6. Reduce conflicts between recreational boating, swimming, shellfishing, and other uses.

7. Coordinate and facilitate dredging necessary for water-dependent uses consistent with water quality and natural resource constraints.

Actions Needed

Develop a harbor management plan as a component of the town's Local Waterfront Revitalization Program that achieves the preceding objectives and includes priority actions such as the following projects and procedural recommendations:

Projects

1. Commercial Fishing and Shellfishing - In the northwest portion of the harbor, acquire a site and construct a commercial fishing and shellfishing loading and unloading dock and parking area. Establish a permanent mooring area for baymen (also see procedural item #3, Navigation). This would also eliminate the traffic safety problem and natural resource impairments resulting from loading and unloading along West Shore Road. (Objectives 1,2,3,5,6)

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2. Navigation - Maintain the harbor channel and anchorage basin at adequate depths, use clean dredge spoil for beach nourishment, and dispose of fine or contaminated sediment in the Western Long Island Sound dump site. (Objectives 1,3,7)

3. Recreation - Move moored vessels further offshore from Gold Star Battalion Beach and extend lines demarcating the bathing area further offshore. Redevelop the lot leased to the Foreign Legion at the south end of the harbor for boat trailer parking and the underground treatment of roadway runoff described below in water quality. (Objectives 1,2,6)

4. Water Quality - Improve water quality by implementing structural and nonstructural urban nonpoint source management practices to manage, control, and treat urban nonpoint runoff and stormwater runoff from roads by constructing retention basins or leaching basins, providing roadway improvements to control and treat runoff, retrofitting direct pipe discharges from roadways to treat runoff prior to entry into the harbor, and maintaining and creating adequate buffers adjacent to the harbor, so as to control and treat runoff prior to entry into harbor. Add denitrification to the town-owned wastewater treatment plant, as recommended in the Long Island Sound Comprehensive Conservation and Management Plan. Provide an additional vessel waste pumpout or dump station for public use at the north end of harbor. Explore the desirability and feasibility of constructing a demonstration project meadow/marsh/pond roadway runoff treatment system using the existing ponding area on the Coindre Hall property to reduce pollutant loadings and sedimentation to the harbor and for habitat improvements and nature study. (Objectives 1,4,5,6)

5. Public Access - Review leases, grants, and easements to town-owned underwater lands and formerly underwater filled lands, reassert public trust rights and interests to those lands where appropriate, and remove or mitigate obstructions where appropriate. (Objectives 1,2,3,5,6)

Procedural

1. Regulatory Simplification - Simplify the state and local regulatory process for public and private actions that are consistent with the harbor management plan. (Objectives 1,2,3,4,5,6,7)

2. Water-Dependent Uses - Maintain the C-9 zoning district in the southern portion of the harbor and elsewhere where commercial water-dependent uses currently exist. Ensure that water-enhanced and non-water-dependent uses cannot displace water-dependent uses. Replace non-water-dependent uses in the C-9 district with water-dependent uses by amending the C-9 zoning text to eliminate non-water-dependent uses, except when they support or complement water-dependent uses. Establish seaward perimeter boundaries for new and existing water-dependent uses within the C-9 zoning districts and, within these perimeters, allow modifications to docks, piers, floats, pilings, etc., without requiring new regulatory permits for minor modifications, but report changes to the town and state. (Objectives 1,2,5,6)

3. Navigation, Anchoring, and Mooring - Prevent impairments to navigation in channels, fairways, and anchorage or mooring areas. Prevent use conflicts between vessels and other uses, such as bathing, by establishing buffer areas adjacent to navigation channels and other uses and by designating public recreational, commercial fishing, marina, yacht club, and boat yard mooring areas. Limit vessel anchoring and mooring adjacent to

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sensitive wetlands and productive shellfisheries in the northern portions of the harbor. Allocate mooring area and establish offshore boundaries consistent with the upland water-dependent uses. (Objectives 1,2,3,5,6)

4. Water Quality - Amend the water quality classification from SA to SB in the Harbor Use District to reflect the actual uses within the harbor. Designate the harbor a federal and state vessel waste no-discharge zone and delegate federal enforcement authority to the state and town, pursuant to section 312 of the Clean Water Act, and develop an implementation strategy for enforcement. (Objectives 4,5,6)

5. In-Water Structures - In areas of the harbor other than those adjacent to the C-9 zoning district, protect public access to and across all publicly owned underwater lands and the foreshore and prevent impairments to navigation by limiting the seaward extension of in-water structures to the minimum necessary for access to navigable waters. (Objectives 1,2,5,6)

6. Harbor Improvement District - Establish a harbor improvement district, pursuant to section 190 of the New York State Town Law, to provide a funding mechanism for public projects and physical improvements in and adjacent to the harbor, such as: water quality improvement projects; studies; construction and maintenance of public launching ramp, parking lots, bulkheads, docks and parks, pumpout and waste reception facilities; anchorage areas; land acquisition; and dredging. (Objectives 1,2,3,4,5,6,7)

7. Tax Assessments - Assess water-dependent uses for their value as water-dependent uses, rather than assessing them as non-water-dependent uses, since non-water-dependent uses would be prohibited by the amended C-9 zoning. (Objectives 1,2,3)

Mattituck Inlet

Mattituck Inlet is located in the hamlet of Mattituck on the north shore of Long Island in the Town of Southold, and is the only harbor on the north shore to the east of Mount Sinai Harbor. The tidal inlet is extremely narrow and approximately two miles long. The widest parts of the inlet, which are only a few hundred feet wide, are in the southern half. The inlet supports substantial vegetated tidal wetlands, shellfisheries, and a state-designated Significant Coastal Fish and Wildlife Habitat. It also contains a number of commercial and recreational water-dependent uses which are concentrated in three locations: at the inlet's extreme southern end; at its midpoint; and on the west shore near the northernmost end of the inlet.

Residential development surrounds most of the inlet. Water-dependent uses include five marinas; commercial fishing, party and charter boats; and a transient anchorage area and two boat ramps in the extreme south end of the inlet. Most of the water-dependent uses are concentrated on the west side of the inlet. Agriculture is a major land use within the inlet's watershed.

Approximately 21 acres of vacant, underutilized land, zoned Marine-II (M-II), is available for new commercial development or redevelopment on the northwest side of the inlet. This is a former industrial area which consisted of petroleum and asphalt tank farms. This area could accommodate new marinas and other recreational or commercial water-dependent uses, or a mix of uses. Sufficient space exists for upland dry rack storage of vessels and limited in-water facilities, boat ramps, and associated parking areas.

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Water-Dependent Uses

Commercial Fishing and Shellfishing

Facilities in the inlet support approximately 20 to 25 commercial fishing vessels. Most of these boats make daily runs, although several make extended trips. There are excellent docking facilities for commercial fishing vessels, with over 250 feet of bulkheaded dock space. One facility has a hydraulic crane for loading and unloading and, unlike most ports on the Sound, provides some gear storage space. No ice is available, and fuel facilities are deficient, requiring fuel to be brought to commercial vessels. Mechanical and engine repairs for commercial vessels are lacking, but is provided by on-call mechanics. Unlike other ports on the Sound, Mattituck is used by transient commercial vessels from Shinnecock Inlet during the summer. Although the inlet is relatively small, it is also an extremely productive shellfish growing and commercial harvesting area of local and regional importance, producing hard clams, soft clams, and oysters.

Recreation

The inlet is the only harbor on the north shore east of Mount Sinai Harbor and provides long-term and transient recreational vessel anchoring, slips, and services. Five marinas in the inlet provide dockage for approximately 600 recreational vessels, and approximately 150 recreational vessels are moored throughout the inlet. The greatest single concentration of moored transient vessels (approximately 25) is located in the federally dredged anchorage area at the extreme southern end of the inlet. Two boat ramps, one owned and operated by the Mattituck Park District for district residents and the other owned by the town and for town residents, are at the south end of the inlet. A 1.3 acre parcel at the extreme northwest corner of the inlet south of the west jetty, recently acquired by the Town of Southold in 1993 using Environmental Quality Bond Act funds, is an appropriate and suitable site for a public boat ramp due to its proximity to the Sound. Two parks and beaches, which are part of the Mattituck Park District, front Long Island Sound on both the east and west side of the inlet and are limited to use by park district residents. The park and beach on the west side abuts the inlet's west jetty at the inlet's entrance. The east park and beach abuts the inlet's east jetty and the Mattituck Inlet Wetlands Significant Coastal Fish and Wildlife Habitat located south of the beach. The inlet also supports some recreational shellfishing. The state-owned wetlands and the park abutting them on the east shore provide opportunities for passive recreation such as nature study and observation.

Natural Resources

Wetlands and Habitat

Vegetated tidal wetlands exist throughout the inlet. The most extensive undisturbed vegetated wetlands are part of the approximately 60-acre state-designated Significant Coastal Fish and Wildlife Habitat, which includes most of the open water of the inlet and its wetlands north of Mill Road. Most of the vegetated wetlands in the designated habitat are owned by the state Department of Environmental Conservation. The remainder of the underwater lands and tidal wetlands is owned by the Town of Southold. Wetlands are highly productive and support a variety of fish and wildlife within the inlet and in Long Island Sound near the inlet, including a substantial soft clam and oyster shellfishery, which is dependent on high water quality and undisturbed wetlands.

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Water Quality

The water quality classification in the inlet is SA, and its highest assigned use standard is shellfishing. The inlet fails to meet the class SA water quality and use standards during the summer. Conditional shellfishing is allowed in the winter except following a 0.2 inch rainfall within a 24-hour period, when coliform loadings exceed acceptable levels. Agricultural and urban nonpoint runoff within the inlet's narrow drainage basin are the primary sources of water quality and shellfish harvesting use impairments. Roadway drainage pipe discharges to the creek have been identified by the town as a source of nonpoint pollution. Water quality and use impairments are also related to large numbers of vessels in marinas and the public anchorage at the south end of the inlet.

Summary of Issues and Problems

The issues and problems confronting Mattituck Inlet as a maritime center are summarized below and illustrated on map 17., 18.0.

Commercial Water-Dependent Uses

Although the existing water-dependent uses are consistent with their current M-II zoning category, the M-II district also allows non-water-dependent uses which could displace the important water-dependent uses. The displacement of docking facilities for the commercial fishing fleet would be disastrous, since the existing facilities are the only ones available in this part of the Long Island Sound region, and their loss would adversely affect the commercial fishing industry on Long Island. There is also a need to maintain the existing marinas in the inlet to meet the demand for recreational vessel storage and servicing. There is an opportunity to facilitate the location of new water-dependent recreational facilities or a mix of water-dependent and water-enhanced uses within the existing 21-acre underutilized area at the north end of the inlet. This area is most appropriate for new water-dependent uses (such as marinas, boat yards, and boat ramps) due to its proximity to the Sound, its previously disturbed and leveled terrain, and few natural resource constraints both on and immediately off-site. This is also one of the only areas in the inlet large enough to provide sufficient buffer area between water-dependent uses and residences. Petroleum tanks have been removed; however, some remaining tanks may still contain asphalt. It is not known if the area is contaminated or in need of remediation prior to redevelopment. If these areas are redeveloped for commercial or recreational water-dependent uses, such as marinas or boat yards, remediation may not be necessary.

Navigation and Access to Underwater Lands and the Foreshore

New in-water structures, such as docks and bulkheads, have become prevalent throughout much of the inlet. These structures impede access along the foreshore and to underwater lands for shellfishing and other uses, and impede navigation in narrow, shallow areas. New in-water structures which adversely affect access and navigation need to be limited to the minimum necessary in order for property owners to exercise their littoral rights of access to the water, in order to prevent impairments to navigation and public access along the shore. Structures that cover large areas of underwater lands should be limited to areas adjacent to upland areas zoned for water-dependent uses, and should be limited in length so as not to interfere with navigation channels and navigation buffer areas. The anchorage at the south end of the inlet does not provide moorings for transient vessels. These vessels must use conventional anchors with greater scope than moorings. As a result, the vessels swing in large arcs and use valuable space in the basin. Vessels often anchor outside of the basin due to a lack of space. Permanent or semi-permanent moorings and tackle for transients, which

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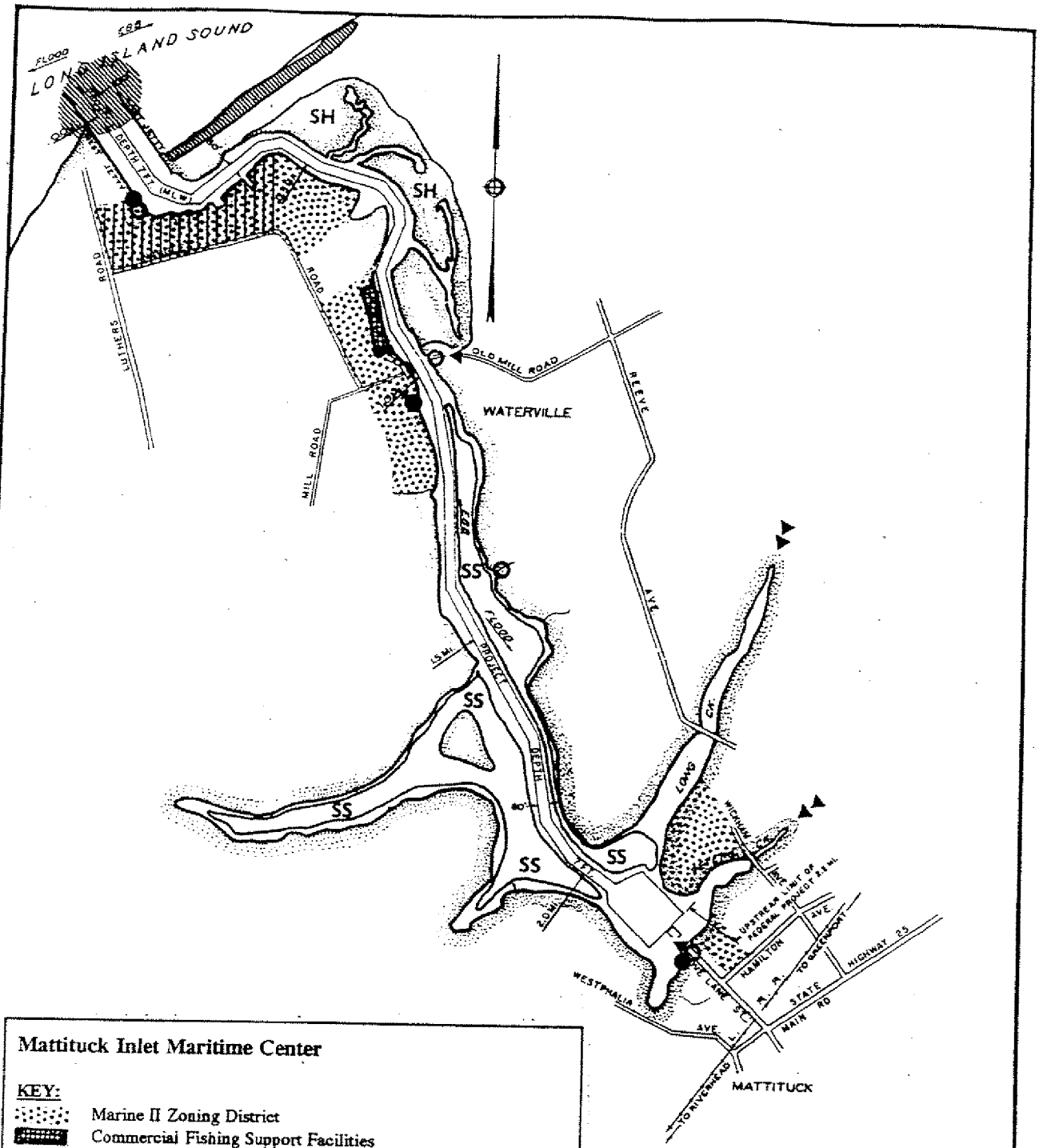

Mattituck Inlet Maritime Center

KEY:

- Marine II Zoning District
- Commercial Fishing Support Facilities
- Opportunity for Water Dependent Redevelopment
- Public Access/Street End Improvements
- Proposed Vessel Waste Facilities
- Dredged Material Disposal/Beach Nourishment/Sand Bypassing
- SH Significant Habitat
- SS Significant Shellfisheries
- Urban/Agricultural Nonpoint Source Pollution

DATUM = 1 M.L.W.-LONG ISLAND SOUND TO OLD MILL ROAD = 2.20 FT. BELOW M.S.L.
1 M.L.W.-OLD MILL ROAD TO HEAD OF PROJECT = 2.06 FT. BELOW M.S.L.

MAP 17.0

MATTITUCK HARBOR, N. Y.

SCALE OF FEET
1000 0 1000

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are safer than conventional anchors and use a shorter scope, would result in better use of space in the basin. A greater concentration of vessels could be moored in the anchorage rather than spread out elsewhere in the inlet.

Infrastructure Constraints

Major new development and major expansions of existing development are constrained throughout the inlet due to the lack of a readily available potable water supply, insufficient roadway infrastructure and parking space for major expansions of existing commercial uses, and insufficient surface water area between the established navigation channel and commercial upland uses. The shallow groundwater table, which has been the area's source of potable water, has been polluted from agricultural pesticides. It is not economically feasible to extend new public water supply lines to the area. Narrow, winding residential streets surround the entire inlet, except at its extreme south end, where a major county road is within a few hundred feet of the Mattituck Park District and town boat ramps. Limited parking is available at the south end of the inlet at the boat ramps, the park and beach at the entrance to the inlet on its west side, and at the park and beach at the entrance to the inlet on its west side (all for district residents only). Little space is available for new in-water structures or uses, since the inlet is so narrow and the existing navigation channel occupies much of the inlet.

Erosion and Inlet and Beach Maintenance

At the entrance to the inlet, beach erosion and shoaling is a problem that needs to be resolved. Shoaling of the inlet is a hazard for large commercial and recreational vessels, and the two jetties along each side of the inlet's entrance prevent the downdrift movement of beach material, resulting in downdrift erosion of the beach on the east side of the inlet. Sand bypassing of the inlet would reduce inlet shoaling and restore the sand budget to downdrift beaches.

Water Quality and Shellfishing

Substandard water quality resulting from nonpoint source pollution precludes the inlet's assigned use for shellfishing during most of the year, except during cold and dry periods during the winter when there is very little runoff entering the inlet. While water quality frequently fails to meet the inlet's assigned SA water quality standards, it may be possible to improve water quality, retain the SA classification, and reopen areas within the inlet for shellfishing. This will require adequate control and treatment of stormwater and agricultural runoff using nonstructural as well as structural management practices prior to its entry into the inlet. If these improvements are effective, the standard for closures might be amended to relax the 0.2 inch rainfall standard to allow shellfishing more often. In addition, use conflicts between shellfishing and concentrations of vessels in marinas and mooring areas need to be minimized in order to reopen portions of the inlet to shellfishing. Some of the potential risks of vessel waste pollution may be reduced by providing sufficient pumpout or dump stations for vessel wastes and designating the inlet a vessel waste no-discharge zone, but the potential for pollution from concentrations of vessels would still exist. In order to effectively resolve these use conflicts, concentrations of vessels will have to be limited to specific areas and prohibited in areas that are most important for shellfish harvesting.

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Summary of Overall Objectives

1. Protect and maintain existing water-dependent uses in their present locations and improve conditions, so that they can operate cleanly and more efficiently, and allow these uses to expand within well-defined limits.

2. Facilitate the siting of new water-dependent uses on former industrial sites at the north end of the inlet, such as at least one public boat ramp and parking area, and marinas and/or boat yards with dry rack storage. Any in-water facilities would be limited in size to prevent intrusions into the main navigation channel of the inlet.

3. Provide necessary infrastructure improvements (roads, parking, water supply, inlet and channel maintenance/bypassing, and water quality improvements) to sustain existing and new development.

4. Maintain high natural resource and habitat values throughout the inlet.

5. Improve water quality for shellfishing and high value habitats by remediating water quality impairments resulting from agricultural and stormwater runoff and vessel waste discharges.

6. Prevent use conflicts between shellfishing in highly productive shellfishing areas and congregations of commercial and recreational vessels in the southernmost anchorage basin, at marinas, and at other facilities and areas within the inlet.

7. Protect, maintain, and improve public access to underwater lands and the foreshore for shellfishing, fishing, recreational boating, and passive recreation.

Actions Needed

Develop a harbor management plan, as a component of the town's Local Waterfront Revitalization Program, that achieves the preceding objectives and includes priority actions, such as the following projects and procedural recommendations:

Projects

1. Commercial Fishing - Provide ice, fuel, and mechanical repair facilities and services for commercial fishing vessels. (Objectives 1,2)

2. Recreation - Provide permanent or semi-permanent mooring tackle at the public anchorage at the south end of the inlet for more efficient use of space by transient vessels, and prohibit concentrations of anchored or moored vessels in productive shellfishing areas. User fees for moorings would pay for upkeep and maintenance of mooring tackle, etc. This would reduce vessel versus shellfishing conflicts by providing for a greater concentration of vessels in the anchorage rather than productive shellfishing areas, and preventing conflicts in important shellfishing areas. Provide a public park and a boat ramp with associated parking lots on the 1.3-acre state-owned parcel on northwest side of inlet. Maintain the inlet channel and anchorage basin at adequate depths and use clean dredge spoil for downdrift beach nourishment. (Objectives 1,2,3,5,6,7)

3. Water Quality - Install detention or retention basins, provide street end improvements to control and treat runoff, retrofit direct pipe discharges from roadways to treat runoff before discharge to the inlet, and maintain or create adequate buffers along watercourses tributary to the inlet. Direct runoff to buffer areas for treatment prior to discharge in

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the inlet. Use federal Clean Vessel Act funds to provide sufficient vessel waste pumpout and dump stations for all vessels using the inlet. (Objectives 1,3,4,5,6,7)

4. Shellfish - Improve water quality by managing, controlling, and treating agricultural and urban nonpoint runoff. Construct detention or retention basins, create buffers, and improve street ends to prevent direct discharges to the inlet. Limit vessel mooring in productive harvesting areas and increase public anchorage capacity to relocate vessels from harvest areas. Establish shellfish spawner areas (especially for oysters). Transplant shellfish from anchorage area, marinas, and channels to spawner areas and other areas for harvesting. Increase access for shellfishing during winter months by providing public boat ramp at north end of inlet. (Objectives 1,2,3,4,5,6,7)

5. Access - Provide a public boat launch near the mouth of the inlet (see recreation above). Limit new bulkheads along the shoreline which result in loss of intertidal areas used for access along the inlet's shoreline. Limit the length of new docks to the minimum necessary to prevent impairments to navigation in channels and access to underwater lands for shellfishing. Provide pedestrian access to the inlet from street ends as part of street end improvements designed to control and/or treat roadway runoff. Maintain the inlet channel and anchorage basin. (Objectives 1,2,3,4,5,6,7)

6. Marinas - Maintain the inlet channel and anchorage basin at adequate depths. (Objectives 1,2,3,6,7)

Procedural

1. Regulatory Simplification - Simplify the state and local regulatory process for public and private actions that are consistent with the harbor management plan. (Objectives 1,2,3)

2. Water-Dependent Uses - Maintain the M-II districts in their current locations to ensure that water-enhanced uses cannot displace water-dependent uses, and amend the M-II zoning text to eliminate non-water-dependent uses. Consider a specific provision for protecting commercial fishing facilities from displacement. (Objectives 1,4,6)

3. In-Water Structures - Establish seaward perimeter boundaries for new and existing water-dependent uses within M-II zoning districts. There is a need to limit the seaward extension of in-water structures given the narrow nature of the inlet. Within these perimeters, allow modifications to docks, piers, floats, pilings, etc., without requiring new regulatory permits for every minor modification, although changes should be reported to the town and state. Allow these in-water uses despite the SA water quality classification. Where commercial uses exist, reclassify surface waters to SB within the area occupied by these uses and within a limited and well-defined adjacent area, where shellfishing does not occur or where the area is not a productive shellfishery. (Objectives 1,2,4,6,7)

4. Tax Assessments - Assess existing water-dependent uses for their value as water-dependent uses, rather than assessing them as non-water-dependent uses, since non-water-dependent uses would be prohibited by the amended M-II zoning. (Objectives 1,2)

5. Water Quality - After sufficient vessel waste pumpout and dump stations are available (the most conservative standard would be one facility for each 300 vessels), designate the inlet a federal and state vessel waste no-discharge zone, and delegate federal

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enforcement authority to the state and town pursuant to section 312 of the Clean Water Act. (Objectives 3,4,5,6,7)

6. Harbor Improvement District - Establish a harbor improvement district, pursuant to section 190 of the New York State Town Law, to provide a funding mechanism for public projects and physical improvements in the inlet, such as water quality improvement projects, studies, construction and maintenance of launching ramps, public docks, anchorage areas, bulkheads, land acquisition, public docking facilities, dredging, etc. (Objectives 1,2,3,4,5,6,7)

PORT JEFFERSON HARBOR

Port Jefferson Harbor is located on the north shore of Long Island in the Town of Brookhaven, in the mid-portion of Suffolk County. It is the largest embayment in a harbor and bay complex which also includes Setauket Harbor, Little Bay, and Conscience Bay. The Village of Port Jefferson has approximately two miles of waterfront on Port Jefferson Harbor, with the central business district located at the head of the harbor. Land uses in the waterfront area of the village include commercial, industrial, retail and residential. With the exception of the property that supported the former Mobil Oil terminal, there are no abandoned or deteriorated properties along the harbor waterfront. Port Jefferson Harbor is also bordered by the Village of Belle Terre to the east, and the villages of Poquott and Old Field to the west. The harbor bottom lands are owned and controlled by the Town of Brookhaven.

Port Jefferson Harbor is approximately 950 acres in size and is one of the largest natural deep draft harbors on Long Island. It contains open water area and intertidal mudflats, with a few remaining areas of salt marsh located along the perimeter. The harbor is bounded to the north by undeveloped barrier beaches and headlands. The mouth of the harbor is located between two coastal barrier features containing Old Field Preserve (located in the Village of Old Field) and McAllister County Park (located in the Village of Belle Terre). Port Jefferson Harbor is bisected by a federal navigation channel that runs in a north-south direction, and is used by a cross-Sound ferry service to Connecticut, as well as a variety of commercial and recreational vessels. The inlet at the mouth of the harbor has been stabilized by jetties.

Water-Dependent Uses

Port Jefferson Harbor has been transformed, in a short period of time, from a harbor that was once dominated by water-dependent industrial uses such as shipbuilding, petroleum transfer and storage, and aggregate transshipment, to a harbor area that is popular for recreational boating and tourism. The Village of Port Jefferson has become a regionally important tourist destination in recent years, primarily due to the presence of the ferry terminal. It should be noted, however, that although the harbor is a more active location for recreational activities, it is still one of the major sites for the importing of petroleum and stone aggregate products in the Long Island Sound region.

Port Jefferson Harbor is extensively used for commercial and recreational boating. Much of this activity is concentrated in the southern half of the harbor. During the boating season, the area east of the federal navigation channel and along the shoreline of the Village of Poquott is occupied by vessel moorings. The majority of the commercial boating activity consists of ferry traffic conducted by the Bridgeport-Port Jefferson Steamboat Company, aggregate transshipment conducted by the Gotham Sand and Gravel Company, and waterborne petroleum deliveries to the Northville Industries pier and the LILCO electric

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power generating plant. These uses are located west of the navigation channel (the ferry service is situated at the head of the channel) and south of the Village of Poquott mooring area.

Marinas, Yacht Clubs, Boat Yards, and Support Services

The Port Jefferson waterfront contains two large marinas (Danford's-Bayles Dock and Brookhaven Town Marina), two yacht clubs (Port Jefferson Yacht Club and Setauket Yacht Club), a large public boat launch ramp, the cross-Sound passenger and cargo ferry, commercial fishing and charter and party boats, the aggregate and oil transshipment facilities, the Port Jefferson wastewater treatment plant, the LILCO power plant, and the former Mobil Oil terminal property. The storage tanks were removed from this site, and it is currently in need of revitalization. In addition to these water-dependent uses, there are a number of support services that accommodate the needs of both commercial and recreational boaters.

Marine-commercial support services in the Village of Port Jefferson include:

- *J & H Launch*, which installs oil spill booms for the Northville and LILCO terminals, provides exclusive marine services to large, commercial ocean-going vessels, and provides oil spill response services for most of eastern Long Island Sound
- *Gudzik's Marine, Inc.*, which operates a boat yard offering repair services, storage, limited sales, etc.
- *Carafitis Fishing Station*, which leases a small waterfront parcel from the Town of Brookhaven to rent rowboats, with a bait and tackle supply shop located one block inland
- *Diesel Marine Services, Inc.*, which has a franchise with the village to operate at the Village of Port Jefferson pier, and provides transport service to moored boats and mooring installation for transient vessels
- *Port Jefferson Marine Maintenance Co.*, which leases dock space at the Bayles Dock for their SeaTow operation and provides limited boat repairs
- *Seven Seas Marine Construction and Engineering Co.*, which builds docks and bulkheads (this facility is located on the Mobil site)

Commercial Fishing and Shellfishing

Port Jefferson Harbor is a productive area for finfish, shellfish, and crustaceans. The northern portions of Port Jefferson and Setauket harbors and Conscience Bay, support hard clam, soft clam, and oyster shellfisheries. There are three commercial fishing boats in Port Jefferson Harbor, with additional boats operating out of Setauket Harbor and Mount Sinai Harbor to the east. Offshore harvesting is also concentrated in the adjacent open waters of the Long Island Sound. Over the past several years the volume of finfish taken from these waters has decreased. Offshore commercial fishing based in Port Jefferson and Setauket harbors is conducted mostly by family-owned businesses.

The waters located offshore of the barrier beaches, at the mouth of Port Jefferson Harbor, are also considered to be some of the best lobster grounds on the East Coast. The Port Jefferson Harbor area is a productive nursery area for lobsters. During the months of late March through early August, concentrations of lobsters support a commercial and recreational fishery of county-wide significance. Current studies estimate than an active lobster harvester can pull 350 to 400 pots per day from this area. At one time eight full-time fishermen operated out of Port Jefferson Harbor, setting lobster pots in this area. Now approximately 13 lobster fishermen operate out of Mount Sinai Harbor. It is believed their relocation was based on reasons of easier access to shoreside facilities and shorter transit time

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to the fishing grounds. The offloading of their catch at the head of Port Jefferson Harbor was not always convenient, and the 2.3-mile trip out of the harbor to Sound waters was more time consuming.

Commercial fishermen in Port Jefferson generally have good access to dock space. The Town of Brookhaven sets aside six slips at the public dock for commercial fishermen. Catch is unloaded from the boats to the parking area. However, no storage of gear is available. Since the Town of Brookhaven boat launch ramp is used extensively by recreational boaters throughout much of the year, it is not a suitable location for additional commercial loading and offloading facilities. This ramp is primarily used by commercial interests for loading and offloading during the winter, when recreational use declines significantly. The Village of Port Jefferson is considering the establishment of additional support facilities for commercial fishermen in the future.

Commercial Vessel Traffic, Mooring, and Navigation

There is a variety of commercial vessels that operate in Port Jefferson Harbor. Most are associated with the commercial and industrial uses located along the shore. Others operate from public docks and mooring fields, including commercial and charter fishing boats (for recreational excursions), party boats, tug boats, and tow boats which provide emergency distress services.

The federal navigation channel runs the entire length of the harbor (2.3 miles) from Long Island Sound to the extreme southern end (the Port Jefferson village waterfront). This channel, which services deep-draft commercial vessel traffic, is 40 feet deep and 350 feet wide. A 700-foot by 1,400-foot turning basin is situated at the south end of the federal channel for use by larger vessels maneuvering at the head of the harbor.

There is a formal barge mooring area located at the northeast end of Port Jefferson Harbor. This mooring area is used by the various commercial operations that transport deliveries into Port Jefferson Harbor, and is also used by commercial vessels seeking refuge during storms. This barge mooring area is located within the boundaries of the Stony Brook-Setauket Outstanding Natural Coastal Area (as discussed below).

The LILCO power station, which is located on the western side of the harbor near the south end of the federal navigation channel, receives petroleum shipments for on-site use and storage. The oil is delivered by tankers and barges, some as long as 500 feet. Tugboats aid these vessels in docking at the LILCO terminal. Barges and tankers also deliver shipments of oil to the Northville Industries terminal, which is located on the western side of the harbor, south of the LILCO facility. Vessels serving the Northville Industries site range up to 800 feet in length. No oil is stored at this facility. All oil shipments received are transported by pipeline to three major inland storage facilities located in East Setauket, Holtsville, and Plainview. Port Jefferson Harbor is one of three areas that consistently receives the largest volume of petroleum product deliveries in the Long Island Sound region. In 1989, the LILCO and Northville facilities received a combined total of 2,453,000 short tons (a short ton equals 2,000 pounds).

Crushed stone is the second largest commodity, after petroleum, shipped on Long Island Sound. Port Jefferson Harbor is one of the four remaining major transshipment points in the region. Transporting stone aggregate by barge is the most cost effective way to bring this material into the Long Island Sound area from western Connecticut and the lower Hudson Valley region. The Gotham Sand and Gravel Company receives the local shipments of

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aggregate stone. These shipments are delivered dockside by barge. The full and empty barges temporarily moor at the barge mooring location in the northeast portion of the harbor. In 1989, the Gotham facility imported a total of 344,000 short tons of stone.

A large portion of the commercial traffic in Port Jefferson Harbor is generated by the Bridgeport-Port Jefferson Steamboat Company. This company operates a ferry service for automobiles and passengers between Port Jefferson and Bridgeport, Connecticut. According to the Bridgeport-Port Jefferson Steamboat Company, in 1993, the company provided service to approximately 266,000 automobiles, 5,000 other vehicles, and 750,000 passengers. Annually, the utilization rate for vehicles is less than 50 percent of capacity. According to the ferry company officials, this is due to: the close proximity of the bridges which provide overland access to Connecticut; the fact that the ferry is utilized primarily by commuters, with the greatest usage occurring during the hours of 6:00 a.m. and 4:30 p.m.; and the constricted access along Route 112 to Port Jefferson from the Long Island Expressway. After the summer tourist season ends, the ferry service is cut back to handle mainly commuter traffic, with the last boat departing Port Jefferson at 6:00 p.m.

The need to develop high-speed ferry service to Connecticut from another location on the north shore of Long Island is being discussed. The Suffolk County Legislature has recently authorized a study to analyze the need for a high-speed ferry service and determine what impact it would actually have on the existing services.

Recreation

Port Jefferson Harbor is one of the more intensely utilized harbors for recreational boating. The harbor is frequented by transient vessels that anchor throughout the harbor, especially on weekends during the height of the summer boating season. Much of the transient mooring occurs in the Narrows and Pirates Cove areas in the northern portion of the harbor.

The Brookhaven Town Marina is a 173-slip facility with a boat launch ramp and parking area that encompasses approximately 5.8 acres. Marina slips are leased to town residents, and there is currently a long waiting list for this facility. The marina can accommodate a small number of transient boats on a nightly basis. The marina contains a public fishing pier and restrooms and a marine vessel waste pumpout station. The launch ramp has adequate parking for both cars and boat trailers.

Port Jefferson Harbor contains a number of permanent and semi-permanent mooring areas, including an informal central area. It has been estimated that this central mooring field can accommodate a maximum of 430 vessels, including 60 transient moorings (Cramer, Voorhis and Associates, April 1991). There is a smaller mooring area off the shore of the Village of Poquott that is utilized by residents. A limited number of boats also moor in the cove area south of McAllister Park (known as Pirate's Cove), in the northeast corner of the harbor, and along the shore of the Village of Belle Terre. In addition, boats moor and anchor throughout the entrance to Conscience Bay in the Narrows area. This area and the Pirate's Cove area are popular anchoring locations for transient boaters on weekends during the summer.

There are approximately 300 moorings located in an informal mooring area at the head of the harbor, in the vicinity of the Port Jefferson Yacht Club. About 60 of these moorings, which are located at the southern end of this mooring area, are used by members of the Setauket and Port Jefferson yacht clubs, and by Diesel Marine Services for transient vessels. The Setauket Yacht Club also uses this area for mooring small training sailboats. These three operations provide transient launch service to their members and customers.

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Danford's Inn and Marina, which includes Bayles Dock, is a marine services complex. In addition to the waterfront hotel and restaurant, this facility offers a yacht brokerage, a dinghy dock, approximately 90 boat slips with transient space, a fueling and marine vessel pumpout station, and the Sunsport Sailing School.

McAllister Park is a coastal barrier formation located at the mouth of Port Jefferson Harbor which consists of 76 acres of undeveloped open space and beaches. This park is owned by Suffolk County. McAllister Park is utilized by boaters, some of whom moor in the nearby Pirate's Cove and access the park from the water, as well as by residents from the Village of Belle Terre and other areas of Long Island who gain landside access.

Old Field Preserve is a 25-acre parcel of village-owned parkland located at the mouth of Port Jefferson Harbor. It comprises the northern portion of the coastal barrier formation which extends east of the Village of Old Field and is under the jurisdiction of the village. This preserve is undeveloped, and upland access is limited due to a series of steep bluffs located at the western end of the barrier. This preserve is primarily used by boaters who access it from the waterside. The Town of Brookhaven owns the southern extent of this undeveloped barrier feature. The eastern tip is owned by Suffolk County and has been designated as a bird sanctuary.

The Village of Poquott has two beach facilities located along the western shore of Port Jefferson Harbor. These parks are 1.2 and 3.7 acres in size and contain swimming areas for village residents.

The Port Jefferson pier is situated on a small parcel of land (less than one acre) which is owned by the Town of Brookhaven and leased by the Village of Port Jefferson. This property is located between the ferry terminal and the Danford's Inn-Bayles Dock property. It is comprised of a small park area and a floating dock. This dock is utilized by Diesel Marine Services for their launch operation (as discussed above).

Brookhaven Beach is a 2.5-acre parcel which contains a small stretch of beach fronting Port Jefferson Harbor. This property is owned by the Town of Brookhaven and leased by the Village of Port Jefferson. It is located at the head of the harbor, east of the ferry terminal, at the Belle Terre village boundary. The village recently improved this property with a boardwalk, a gazebo, erosion control materials along the shoreline, and permeable paving. (A portion of this property is occupied by the Setauket Yacht Club, which also has a lease with the town).

Infrastructure

The harbor shorefront, including its water-dependent uses and transportation network, is an integral part of the village's central business district (CBD). Activities on the waterfront and activities in the CBD complement each other. The CBD is within walking distance of the harbor and contains a number of restaurants and other retail businesses that are supported by seasonal harbor and ferry usage. Public on- and off-street parking exists throughout the commercial area adjacent to the harbor. Roadways at the head of the harbor are located adjacent to and surrounding the shoreline. New York State Route 25A is the main access roadway to the waterfront. This road generally has two lanes in each direction, with additional turning lanes at major intersections. This road passes through a 90-degree turn at the head of the harbor.

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The harbor's watershed is extensively developed. Stormwater runoff in this area is presently captured by a system of catch basins that drain directly to the harbor. At present, the village has no physical engineering records of this system, or any appurtenances installed prior to 1963, and cannot properly assess the full impacts of storm drainage to harbor waters.

The Port Jefferson Wastewater Treatment Plant (WWTP) presently services an extensive portion of the village. The Port Jefferson plant was upgraded in 1988 to provide secondary treatment; prior to that time, the plant had been discharging primary-treated wastewater into the harbor. Treated effluent is released into the harbor through an outfall pipe which is buried on the harbor bottom. The wastewater is discharged up into the water column, creating a localized "boiling" effect.

The State University of New York at Stony Brook (SUNY-Stony Brook) was hooked into the Port Jefferson WWTP prior to the 1988 system upgrades. Concurrent with the changes made to the Port Jefferson plant, SUNY-Stony Brook upgraded its on-site wastewater system to an advanced collection and treatment process. Originally, wastewater collected from the campus was pumped without prior treatment directly to the Port Jefferson WWTP. The university now has an advanced tertiary treatment system in operation which includes an oxidation ditch to facilitate the removal of nitrogen. Treated wastewater collected from the campus now bypasses the Port Jefferson WWTP and is combined with the plant's discharge through a common outfall pipe into the harbor.

The state-permitted flow of wastewater from the Port Jefferson WWTP is 850,000 gallons per day. The state has also set a limit for nitrogen output of 400 pounds per day (190 pounds for the Port Jefferson plant and 210 pounds for the SUNY-Stony Brook facility). The nitrogen limit is actually 500 pounds per day, but the state has reserved a 100 pounds per day limit for nonpoint sources. The plant currently discharges between 725,000 and 850,000 gallons per day of wastewater, with a nitrogen output of approximately 130 pounds per day. The SUNY-Stony Brook plant has a nitrogen output of approximately 100 pounds per day.

Both the state and the county conduct water quality sampling in Port Jefferson Harbor, but the scope and regularity of this sampling data are limited and are not sufficient to reach any conclusions regarding water quality trends. The county samples for nitrogen and a number of other parameters, collecting samples throughout the harbor, from the lower reaches at the head of the harbor to the mouth. It also conducts dye tests through the WWTP outfall to study dispersion rates. The state samples for total and fecal coliform bacteria, primarily in the northern portion of Port Jefferson Harbor.

Natural Resources

Wetlands and Habitat

Almost the entire Port Jefferson Harbor complex has been designated as a Significant Coastal Fish and Wildlife Habitat by the New York State Department of State. Only the southern extreme of the harbor, including the offshore areas in the vicinity of the LILCO and Gotham Sand and Gravel facilities and the Port Jefferson village waterfront, has been excluded from this designation. The harbor was determined to be of environmental significance based on its size, its use as a commercial lobster and recreational fishery, and its importance as a wintering area for waterfowl. This area is surrounded by a high proportion of undeveloped land, and the surface waters and adjacent uplands sustain a high diversity and large populations of wildlife, fish, and other freshwater and estuarine organisms.

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Port Jefferson Harbor, and the adjoining embayments in the harbor complex, are considered to be of regional significance as winter concentration areas and migration resting areas for a variety of avian species. The salt marshes, intertidal mudflats, and shallows in this area are used by shorebirds, wading birds, waterfowl, and passerines. In particular, several regional species of special emphasis use this area, such as American black duck, lesser and greater scaup, mallard, Canada goose, canvasback, oldsquaw, bufflehead, common goldeneye, American wigeon, and red-breasted merganser. The use of this area by waterfowl during the winter is influenced, in part, by the extent of ice cover in any given year.

The protected coastal waters of the Port Jefferson Harbor complex are also extremely productive habitat for marine finfish, shellfish, and crustaceans. These waters serve as spawning, nursery, and feeding areas, especially for winter flounder, bluefish, blackfish, Atlantic silverside, hard-shelled clam, soft-shelled clam, American oyster, and lobster. There are also indications that the harbor and nearby parts of Long Island Sound are used by juvenile Kemp's ridley sea turtles, an endangered species and one of the rarest sea turtles.

The northern half of Port Jefferson Harbor supports extensive, high value vegetated and unvegetated tidal wetlands. Recognizing that tidal wetlands are valuable in terms of providing wildlife habitat, marine food production, flood and sedimentation control, recreation, and aesthetics, both the state and the Town of Brookhaven regulate these areas.

The barrier beaches at the mouth of Port Jefferson Harbor contain significant nesting colonies of piping plovers and least terns (both listed as endangered species) and common terns (a threatened species). The actual number of nesting pairs varies from year to year based on the extent of disturbance during the nesting period.

The entire northern portion of Port Jefferson Harbor has been included within the boundaries of the Stony Brook-Setauket Outstanding Natural Area (ONCA). The coastal barrier features at the mouth of the harbor are also included within this boundary, as they contain areas of naturally-vegetated upland, wetlands, and dunes. The lower portion of Port Jefferson Harbor was excluded from this area due to the lack of requisite features. Human activities in this area, however, can affect these resources. Past and present land uses, including industrial activities in Port Jefferson, have resulted in primary, secondary, and cumulative impacts to the natural resources within the upper reaches of the ONCA. Heavy boat traffic, vessel discharges, and point and nonpoint source contaminants all degrade water quality, indirectly impacting significant resources.

Water Quality

The northern portion of Port Jefferson Harbor is classified SA. Marine waters are classified in terms of their best usage, with SA indicating that the waters are best suited for shellfishing for marketing purposes and for primary and secondary contact recreation. It should be noted that water quality classifications are used to establish discharge standards, and are not necessarily indicative of the existing water quality conditions. The southern portion of Port Jefferson Harbor is classified SC. SC waters are considered best suited for fishing, fish propagation, and secondary contact recreation. The boundary between these two areas runs in a northeasterly direction, extending from the LILCO power plant in Port Jefferson village to the terminus of Beach Road in Belle Terre village. Previous land uses along the waterfront and within the lower reaches of the harbor have degraded the water quality in this area. Boat pollution, nonpoint source contaminants in stormwater runoff, and sewage

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effluent have been cited as the major contributing factors to the poor water quality. These factors are responsible for the downgraded SC classification at the head of the harbor.

Effluent from the Port Jefferson Wastewater Treatment Plant and the treated discharge from the on-site sewage collection and treatment system on the SUNY-Stony Brook campus are combined at the head of the outfall pipe, which extends into the harbor. Together these facilities discharge approximately 230 pounds of nitrogen per day into Port Jefferson Harbor. The Suffolk County Department of Health Services has detected high amounts of nitrogen in the harbor, and reports detecting output amounts totalling approximately 1,100 pounds per day. This exceeds the output of 230 pounds per day from the wastewater treatment plants. The source of this additional nitrogen has been attributed to nonpoint sources (B. Wright, Suffolk County Department of Public Works, August 5, 1994).

As noted, Port Jefferson Harbor is extensively used by commercial and recreational boaters. section 95-15 of the Port Jefferson Village Code prohibits the discharge of any waste (including sewage) into harbor waters. This regulation, however, is difficult to enforce. There are presently two marine vessel waste pumpout facilities located at the head of the harbor. One is a mobile pumpout which is situated on the Bayles Dock and utilized by boaters who patronize the services at the Danford's facility. The other pumpout is located at the Town of Brookhaven marina. This facility is located along the dock in an area near the shore that becomes shallow at low tide, making it less accessible to all vessels that would otherwise use it. It is possible to modify this pumpout by extending a drain line along the dock to a more accessible part of the marina. In general, the existing pumpout facilities located on the waterfront are not sufficient to service the number of vessels utilizing Port Jefferson Harbor.

Summary of Issues and Problems

The issues and problems confronting the Port Jefferson Maritime Center are summarized below and illustrated on map 0.

Land Use and Public Access

The Port Jefferson waterfront, from the LILCO facility on the western shore to the Village of Belle Terre boundary on the eastern shore, is zoned Marina-Waterfront (MW). Some of the uses permitted as-of-right in this district are not water-dependent, such as parking facilities and municipal structures. In addition, some of the uses presently existing on the waterfront are not specified as either permitted or conditional uses in an MW district. The Gotham Sand and Gravel operation is a nonconforming use, which has a use variance based on a certificate of existing use. The MW zoning classification requires some revision to accurately reflect current use of the waterfront area and allow for a greater variety of water-dependent activities.

The Mobil Oil property is primarily vacant, in need of revitalization, and should be redeveloped as a public resource. This property is located directly east of Danford's Inn. The Seven Seas Marine Construction and Engineering Company has an office on this property. There is also a law office located in another structure on the property that has been informally identified as an historic resource. The site represents prime waterfront land that should be developed in a manner that would benefit the public at large. Plans have been recently proposed to redevelop this property as a maritime center to include seaport facilities, an ecocenter, and other education exhibits and facilities.

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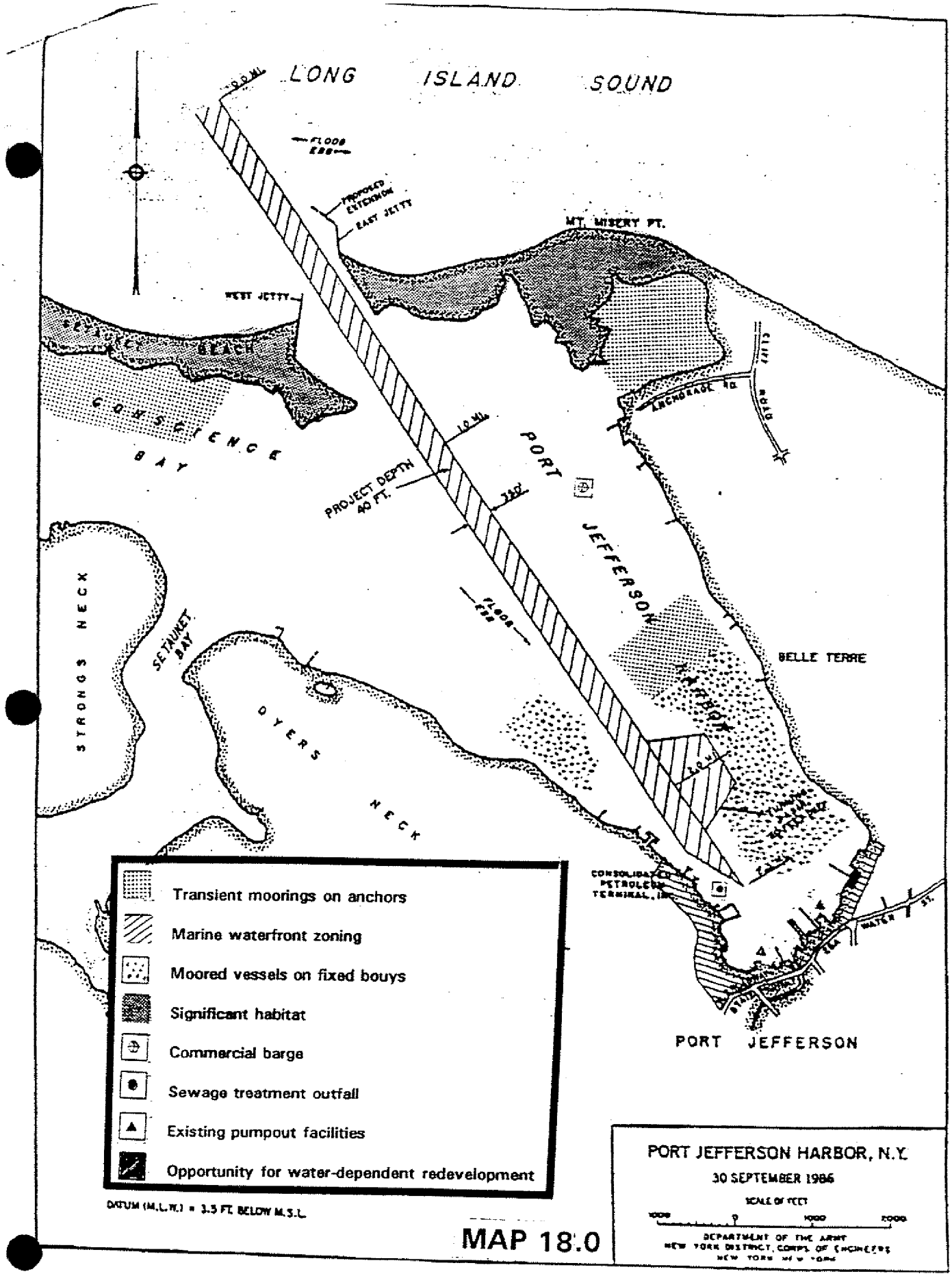
LONG ISLAND SOUND
FLOOD EBB
PROPOSED EXTENSION
EAST JETTY
MT. MISERY PT.
WEST JETTY
BEACH
CONSCIENCE BAY
ANCHORAGE RD.
PORT JEFFERSON
PROJECT DEPTH 40 FT.
STRONGS NECK
SETAUKET BAY
OYERS NECK
BELLE TERRE
HARBOR
CONSOLIDATED PETROLEUM TERMINAL, INC.
WATER ST.
PORT JEFFERSON
Transient moorings on anchors
Marine waterfront zoning
Moored vessels on fixed bouys
Significant habitat
Commercial barge
Sewage treatment outfall
Existing pumpout facilities
Opportunity for water-dependent redevelopment
DATUM (M.L.W.) = 3.5 FT. BELOW M.S.L.
MAP 18.0
PORT JEFFERSON HARBOR, N.Y.
30 SEPTEMBER 1986
SCALE OF FEET
1000 0 1000 2000
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

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Vessel Use, Navigation, and Dredging

The southern portion of the harbor is subject to extensive commercial and recreational boating activity, including mooring, ferry transport, and commercial shipping operations. With the extent and number of uses and activities occurring in this area, it is not uncommon for conflicts to develop. A harbor management plan and a mooring plan are needed to organize vessel traffic, minimize congestion in the central portion of the harbor, and address conflicting harbor uses.

There is a problem with shoaling at the head of the harbor due to propeller wash caused by tugboats that maneuver barges at the sand and gravel facility and by the bow thrusters on the ferry, which displace bottom sediments. An organized maintenance dredging program is required for the areas which are located outside the federal channel to insure their continued use without complication. This program should involve a permitting system that allows for regular dredging without permit renewal for a multi-year period. Furthermore, all of the parties requiring such services should be named on this permit so that separate applications are not required each time a dredging project must be undertaken. All dredging needs must be assessed and coordinated with the Town of Brookhaven.

Oil shipments are presently brought into the harbor and delivered by tankers and barges to the LILCO power station and the Northville Industries terminal. During periods of low tide, these vessels must wait in the deeper waters of the Sound for proper tidal conditions. At times, this layover can extend for several hours, during which the ships are positioned by launch services. In addition, the increased recreational use of the harbor has led to occasional conflicts with commercial vessels in the waters at the head of the harbor. The feasibility of relocating the petroleum pipeline to an offshore unloading terminal should be explored. This action has been done successfully at the Northville facilities in Riverhead, as well as at the LILCO power plant in Northport. Relocating the pipeline would result in less crew layover time, more convenient access to the off-loading facilities, and reduced vessel conflicts at the head of Port Jefferson Harbor. In addition, it would eliminate one source of propeller wash, which causes shoaling in the lower reach of the harbor. As noted above, propeller wash from the tug boats that frequent this area increases the need for maintenance dredging.

Infrastructure

Improved road access for industrial uses along the western shore of the harbor needs to be developed to accommodate commercial truck traffic that has difficulty traveling on the existing roadway that borders the harbor. Truck traffic to the Gotham facilities and the Port Jefferson WWTP must travel along Beach Street, which is a narrow thoroughfare and not suited for this type of traffic. When the trucks access West Broadway, they must climb a steep grade which creates problems and potential traffic conflicts because they cannot not readily attain sufficient travelling speeds. Road improvements or an alternative route are needed to address this problem.

The present sewer district boundaries do not include all of the Village of Port Jefferson. There are a number of older homes in portions of the village that have failing septic systems and cesspools, or that may be illegally discharging untreated wastes into the stormwater drainage system. There are also some existing and new developments that have been seeking access to the district. The new developments will require septic or other larger on-site wastewater treatment systems if district hookup is not permitted. The septic effluent which leaches into groundwater ultimately flows to Port Jefferson Harbor, because most portions

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of the village are located upgrade of this water body. Expansion of the sewer district is required to address water quality problems related to nonpoint source pollution generated in non-sewered areas.

The upper portion of the village contains hilly streets and steep slopes that drain rapidly to the harbor due to poor soil permeability and extensive paving. The stormwater runoff carries fine-grained sediments and associated nonpoint source contaminants that eventually reach harbor waters. During heavy rains, the streets of lower Port Jefferson village convey large amounts of runoff into the storm drainage system. This system currently discharges directly into the harbor, with no detention or settling capabilities to effectively retain or filter out these materials. The storm drainage system has never been inventoried, and no adequate engineering records of the system exist to allow the village to properly address this problem. In addition, the storm drains located along NYS Route 25A are not regularly maintained by the New York State Department of Transportation. The village conducts a street cleaning program weekly, but storm drains are only cleaned once a year in the spring. Due to the proximity of NYS Route 25A to the harbor, the regular maintenance of the storm drains located along this roadway, as well as the storm drains on other village-owned streets, is of critical importance.

During periods of heavy rainfall which coincide with a spring tide, the lower portion of the village business district floods because water flowing through the stormwater drainage system is retained by the high water in the harbor. A deficiency exists in the infrastructure which must be evaluated to address this problem.

Natural Resources

The northern portion of Port Jefferson Harbor has been designated as an Outstanding Natural Coastal Area. This area contains barrier beaches with naturally vegetated uplands, areas of wetlands, and dunes. It is a productive shellfishery and a resting and breeding area for waterfowl. The lower portion of the harbor has been designated a Maritime Center because of the extent and variety of commercial and recreational water-dependent uses, and its current and historic maritime character. Meeting the objectives of these two designations requires cooperative planning. The development and implementation of a harbor management plan is a logical way to address these concerns.

Water Quality

Port Jefferson Harbor is an important shellfish producing area; however, past uses along the shoreline of the harbor and within the harbor itself have resulted in an overall degradation of water quality in the past two decades. Sewage effluent discharged from the Port Jefferson WWTP and the SUNY-Stony Brook wastewater treatment facility, as well as nonpoint source contamination from poorly maintained cesspools and septic systems in unsewered areas, have been cited by the Department of Environmental Conservation as contributing causes of water quality degradation in the harbor. Vessel wastes discharged from boats in the harbor and additional contaminants carried in stormwater runoff further degrade harbor water quality. These factors account for the downgraded SC classification of the waters at the head of Port Jefferson Harbor.

Due to poor water quality conditions in Port Jefferson Harbor, a significant portion of the SA-designated waters do not meet state criteria for commercial and recreational shellfish harvesting, and have been uncertified since 1984. The year-round closure line for shellfishing occurs in the Narrows area, at the extreme northwestern end of the harbor, and runs in a northeasterly direction from a rock jetty just south of Setauket Harbor to the rock

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jetty at the eastern tip of Old Field Preserve. Of late, harbor water quality has improved sufficiently in the northern portion of the harbor for NYS DEC to operate a conditional shellfish harvesting program during periods of dry weather in the winter months in a limited area southeast of the year-round closure line. These improvements were noted after the upgrades were made to the wastewater treatment plant. However, water quality has not improved to a degree that the uncertified status of harbor waters can be rescinded.

The Department of Environmental Conservation has recorded total and fecal coliform bacteria levels for water samples taken at several stations throughout Port Jefferson Harbor pursuant to the requirements of the National Shellfish Sanitation Program. The majority of the sampling stations are located in the SA waters, in the northern portion of the harbor (Hastback, NYSDEC, August 4, 1994). Current data have indicated that the stormwater discharge from Port Jefferson Creek is a major source of coliform bacterial contamination to the harbor, with levels that are consistently higher than the discharge from the Port Jefferson WWTP. This creek is located at the head of the harbor in an area where tidal flushing is relatively reduced. The dispersion of contaminants in this area is less rapid than the more highly flushed areas in the northern portion of the harbor. In response to this problem, the Suffolk County Health Department conducted dye-testing of homes in the vicinity of the creek and located a number of illegal sewer hook-ups. These homes were connected into the sewage district, mitigating the coliform problem in this area. However, nonpoint source pollution and marine vessel pollution continue to be critical sources of water quality degradation in this portion of the harbor.

There are currently two vessel waste pumpout stations located on the waterfront at the head of Port Jefferson Harbor. The town marina pumpout facility needs to be modified to make it more accessible to local and transient boaters. This could be accomplished by running a drain line along the dock to deeper waters. This device is presently located in an area near the shore that becomes more difficult to access at low tide. In addition, a high volume of transient mooring occurs in the northern portion of the harbor, particularly in the Narrows and Pirate's Cove areas. The existing pumpout facilities are located about two miles from these areas and are not convenient to transient boaters. To effectively address the problem of vessel waste discharges, mobile pumpout stations could be located in these waters. This approach has been taken by the towns of Southampton and Oyster Bay. The Town of Brookhaven, in conjunction with the village, should investigate the potential use of these devices. In addition, the possibility of contracting the maintenance and operation of these facilities with a private service (such as J & H Launch, who presently provides oil spill response and other related services) should be explored.

Summary of Overall Objectives

1. Facilitate commercial and marine recreational development that will maintain the historic character and enhance the vitality of the Village of Port Jefferson waterfront.

2. Protect and maintain existing water-dependent uses in their present locations, and improve conditions so that these uses can operate cleanly and more efficiently in order to prevent further harbor congestion, use conflicts, and use impairments in the harbor. Protect existing commercial water-dependent uses along the southwestern shore of the harbor, but limit their expansion or the development of new facilities.

3. Maintain adequate depths in the federal navigation channel, and in the areas at the head of the harbor where ferries and tugboats operate, to support associated water-dependent uses. Coordinate all dredging activities with the Town of Brookhaven.

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4. Prevent the anchoring or mooring of vessels or floats in channels, bathing areas, productive shellfishing areas, or in other inappropriate areas. Allocate space for mooring areas and properly regulate this activity.

5. Improve water quality in the northern portion of the Port Jefferson Harbor so as to warrant the existing SA classification and fully satisfy the state criteria for shellfishing and bathing, thereby allowing for the recertification of these waters. Improve the water quality conditions at the head of the harbor in order to upgrade the current SC classification.

6. Provide necessary infrastructure improvements to sustain existing development, improve water quality, and maintain navigation in the harbor (such as sewage treatment plant expansion and upgrades, stormwater runoff control, navigation channel and basin dredging, and bulkhead maintenance).

7. Minimize vessel waste discharges into the harbor by providing an adequate number of accessible pumpout stations. Encourage maximum utilization of these facilities through the implementation of appropriate public education programs.

8. Assure adequate long-term loading and unloading areas and vessel mooring for commercial fishing and shellfishing operations.

9. Preserve and protect the harbor's shellfishery resources and the industry that it supports.

10. Reduce conflicts between recreational and commercial boating, swimming, shellfishing, and other uses.

11. Improve recreational access to the shoreline for both passive and active public use in an effort to improve the quality of the waterfront and the tourism activities it supports.

Actions Needed

Prepare a harbor management plan as a component of the village's Local Waterfront Revitalization Program that achieves the preceding objectives and includes priority actions such as the following proposed projects and procedural recommendations:

Projects

1. Land Use and Public Access - The Mobil Oil property located along the eastern shoreline is in need of revitalization. Consideration should be given to the current proposal to redevelop this site as a maritime educational center that would provide public benefits through the development of a seaport, an ecocenter, and other educational facilities and exhibits that will focus on the history and preservation of the Port Jefferson waterfront. In concert with this proposal, improvements should be made to upgrade access to Brookhaven Beach, which was recently revitalized by the village. The major petroleum and stone aggregate transshipment facilities should be preserved and protected as essential water-dependent uses in Port Jefferson Harbor and the Long Island Sound region (Objectives 1, 2, 8 & 9)

2. Navigation, Anchoring, and Mooring - Assist the Town of Brookhaven with the preparation of a comprehensive harbor management plan that is consistent with the Long Island Sound Coastal Management Program, and which includes provisions for the subsequent development and implementation of a mooring plan for commercial and recreation vessels and a flexible multi-year dredging program for the harbor.

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Investigate the feasibility of siting an offshore petroleum unloading terminal outside the mouth of Port Jefferson Harbor (Objectives 2, 3, 4, 6, & 10)

3. Infrastructure - Expand the sewer district to include all private homes and new developments within the Port Jefferson village boundaries that use (or will use) cesspools, septic systems, or other on-site treatment systems. The ultimate goal is to eventually have the entire harbor watershed sewered (Objectives 6 & 9)

4. Water Quality - Establish a dye-testing program to identify failing cesspools and septic systems in the vicinity of Port Jefferson Harbor, as well as illegal connections to the storm drainage system. Inventory the stormwater drainage systems and develop a comprehensive stormwater management plan for the Port Jefferson Harbor watershed containing strict construction guidelines and landscaping requirements. Provide additional stationary vessel pumpout facilities for public use at convenient locations, and improve access to the existing pumpout at the town marina. In addition, investigate the feasibility of providing publicly or privately operated mobile pumpout stations at critical locations in the upper reaches of the harbor. Encourage the New York State Department of Transportation to implement a program for the regular cleaning of the storm drainage appurtenances along NYS Route 25A that discharge into Port Jefferson Harbor (Objectives 5, 6, 7, & 9)

Procedural

1. Regulatory Simplification - Simplify the state and local regulatory process for public and private actions that are consistent with the harbor management plan (Objective 2)

2. Water-Dependent Uses - Maintain the Marine Waterfront (MW) zoning district in the waterfront area to insure that commercial water-dependent uses are not displaced by non-water-dependent uses. Amend the zoning text, where appropriate, to allow only water-dependent uses as permitted uses in MW district, and expand the listing of permitted water-dependent uses to reflect current waterfront conditions. Municipal parking facilities and certain other municipal structures are currently permitted uses but are not water-dependent. The zoning of specific parcels on the southwestern shoreline also requires review and possible revision (Objectives 1 & 2)

3. Harbor Improvement District - Establish a harbor improvement district, pursuant to section 190 of the New York State Town Law, to provide a funding mechanism for public projects and physical improvements in and adjacent to the harbor, such as: water quality improvement projects; environmental studies; construction and maintenance of docks, bulkheads, public mooring and anchorage facilities, the public launching ramp, pumpout and waste reception facilities, and public parks; dredging and dredge spoil disposal; land acquisition; etc. (Objectives 1, 2, 4, 6, 7, 8, 9, 10 & 11)

4. Tax Assessments - Assess water-dependent uses for their value as water-dependent uses, rather than assessing them as non-water-dependent uses since non-water-dependent uses would be prohibited by the amended MW zoning (Objectives 1 & 2)

5. Navigation, Anchoring, and Mooring - Maintain the federal navigation channel and turning basin at adequate depths; regularly maintain commercial ferry slips and tugboat operating areas to facilitate commercial and waterborne industrial operations; and establish an officially regulated public mooring area in the central portion of the harbor,

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and regulate mooring activities in other portions of the harbor currently used for unauthorized commercial and recreational mooring (Objectives 3 & 4)

6. Water Quality - Designate the harbor as a federal and state vessel waste no-discharge zone and delegate federal enforcement authority to the state and Town of Brookhaven, pursuant to section 312 of the Clean Water Act, and develop a strategy for enforcement (Objectives 5, 7 & 9)

Port Chester Harbor

Port Chester Harbor is located in the northernmost portion of Westchester County on Long Island Sound, west of Greenwich, Connecticut. The commercially developed harbor area comprises the eastern portion of the village's central business district. Port Chester contains three marinas, two yacht clubs, two aggregate transshipment locations at a cement and asphalt plant, a petroleum unloading and transfer facility, and modest storage areas for commercial fishing equipment, most notably lobster crates. Recently, a petroleum storage facility was phased out. The harbor is serviced by a federal navigation channel and basin.

The primary land and water use objectives in this harbor are to protect and maintain existing water-dependent commercial uses, except for those uses that will be removed as part of the village's waterfront redevelopment projects, and to promote the development of new water-dependent commercial uses, primarily marinas, on underutilized waterfront sites.

New Rochelle Harbor-Echo Bay

Echo Bay and New Rochelle Harbor are located in the southern most portion of the Westchester County shore on the Sound. The commercially developed harbor area is separated from, but in close proximity to, the central business district. Like Mamaroneck Harbor, nearly all the water-dependent uses serve the needs of recreational boaters; however, there are no boat yards. There are six marinas and eight yacht clubs. There are modest storage areas for commercial harvesters, especially lobster crates. Within the past 20 years, similar to Mamaroneck Harbor, New Rochelle Harbor was used as a receiving point for aggregate shipments and Echo Bay for unloading and storage of petroleum products. These uses no longer exist. There are two federal navigation channels, one in each harbor, and a basin in Echo Bay.

The primary land and water use objectives are to protect and maintain existing uses, to improve the conditions in which they function, and to accommodate new marinas and other type recreational uses on underutilized sites.

City Island-East Bronx Shore

City Island-East Bronx Shore is located in the Bronx on Eastchester Bay. City Island is densely developed with water-dependent uses and a large portion of the island's edge is used for water-dependent uses. Many water-enhanced uses, mostly restaurants, and residential uses are located on the inland portion of the island. Numerous boat equipment shops and services exist to serve the needs of recreational boaters. City Island has eight marinas, six yacht clubs, two boat yards, a concentration of party and charter recreational fishing boats, some commercial fishing vessels, and an oil unloading and storage facility. On the East Bronx Shore, between Pelham Bay Park and Throg's Neck Bridge, there are four marinas and two yacht clubs. No federal navigation channel or basin exists.

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The primary land and water use objectives are to protect and maintain existing uses, to foster limited development of new water-dependent uses on underutilized sites, and to improve the conditions in which they function.

Port Washington

Port Washington is located on Manhasset Bay in Nassau County in the western portion of the county's frontage on Long Island Sound and is densely developed with water-dependent uses. There are ten marinas, five yacht clubs, five boat yards, a concentration of charter and party recreational fishing boats, and an oil transfer and storage facility. Many shops and services exist in the Port Washington hamlet and the Village of Manorhaven to serve the needs of recreational boaters. Manhasset Bay was once used to import aggregates, but is no longer used for this purpose. A federal navigation channel and basin serve Manhasset Bay.

The primary land and water use objectives are to protect and maintain existing uses, to accommodate new marinas and other types of recreational uses on underutilized portions of the waterfront in Manorhaven, and to improve the conditions in which they function.

Glen Cove Creek

Glen Cove Creek is located on Hempstead Harbor in Nassau County in the mid-portion of the county's frontage on Long Island Sound. There are two marinas, three yacht clubs, a boat yard, two aggregate transshipment facilities, and an oil transfer and storage facility. A federal navigation channel serves the creek. The city's central business district exists just to the east of the eastern side of the creek. Consideration will be given to including water-dependent uses located on the west shoreline of Hempstead Harbor in this Maritime Center, provided existing parks on the west shoreline of the harbor are not affected.

The primary land and water use objectives are to protect and maintain existing uses, to improve the conditions in which they function, and to accommodate new water-dependent commercial and industrial uses on underutilized sites along the creek. A major impediment to siting new uses in this area is the need to assess the full extent of hazardous waste contamination in the upland area near the creek and in the creek itself and to complete remedial action. Hazardous waste site assessments are being conducted by the state and the U.S. Environmental Protection Agency.

Northport Harbor

Northport Harbor is in western Suffolk County, and like Huntington Harbor, is within the largest harbor and bay complex on Long Island Sound. The commercially developed harbor is in integral part of the Village of Northport's central business district, and has three marinas, three yacht clubs, a boat yard, and a large public dock within a public park, and provides mooring facilities for commercial fishing and charter and party boats. A small federal channel parallels the public park, leading to a federally dredged anchorage area, a village dock, and commercial water-dependent uses near the park. Fishing and boat building have been replaced by parkland and recreational uses, except for an historic boat yard.

On the west side of Northport Harbor, there is potential for a maritime museum that could include provisions for increased public access, a dock and boardwalk, and reuse of a seaplane hanger for marine science research.

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The primary objectives in this harbor are to protect and maintain existing uses, to improve conditions within which they operate, allow appropriate expansions of existing uses, and to provide a clean and efficient harbor area which supports these uses.

Other Harbor Areas Not Considered Maritime Centers

Milton Harbor in Westchester County, Oyster Bay in Nassau County, and Cold Spring Harbor, Nissequogue River, Stony Brook Harbor, Mount Sinai, and West Harbor on Fishers Island in Suffolk County contain a modest number of water-dependent commercial and industrial uses. However, the existence of high value natural resources and the need to protect these resources, the existence of established residential communities, or the lack of adequate land-side and water-side infrastructure outweighs the need to promote water-dependent uses in these areas.

ENHANCING MARITIME CENTERS FOR WATER-DEPENDENT USES

Infrastructure improvements, harbor management planning, regulatory changes, and coordinated dredging and dredge disposal would ensure more efficient waterborne transport of essential commodities, such as commercial fish harvests, aggregates for use in construction projects, and petroleum fuel products for homes, motor vehicles, and power plants. Improving Maritime Centers would also ensure recreational enjoyment for thousands of pleasure boat operators and fishermen who use the Sound's waters.

For Maritime Centers, the state will:

- Prepare management plans.

  A management plan will be prepared for each Maritime Center in consultation with local governments. The plan will:

  - provide harbor specific information about existing conditions, such as land and water uses, uses permitted by zoning, historic resources, natural resources, landside and waterside infrastructure, and public access
  - describe the inland and waterside Maritime Center boundary
  - include a description of the issues and objectives that the plan will focus on, such as desired land and water uses, redevelopment opportunities and objectives, navigation and dredging needs, public access objectives, landside and waterside infrastructure needs and priorities, and natural resource protection and restoration objectives
  - contain performance standards and design guidelines to guide future development
  - establish boundaries

  Boundaries will be established for each Maritime Center as the management plans are being prepared. Generally, areas that will be considered for inclusion in the Maritime Center boundary include: land currently used for water-dependent uses; underutilized land where the development of new water-dependent uses is desired; surface waters committed to or necessary for water-dependent uses; and adjacent upland containing commercially developed properties, such as business districts, that are or could be connected to the marine commercial waterfront and contain uses supportive or complementary to water-dependent uses. If inadequate land area exists to accommodate development of working coast uses where growth is desired, land adjacent to or near the marine commercial waterfront should be assessed to determine the feasibility of

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accommodating working coast uses and the appropriateness of being included in Maritime Center boundary.

- Establish infrastructure investment priorities.

  Work with local governments and the private sector to set priorities for public and private sector investments in infrastructure, such as maintenance dredging of navigation channels and anchorage basins, and construction and maintenance of docks and piers, bulkheads, boat ramps, parking lots, rest rooms, pumpout stations, and waterfront parks, to improve the quality of these areas. Infrastructure improvements will better support existing uses and foster the development of new water-dependent uses.

- Promote mixed use developments.

  Flexibility in the state policy on waterfront development in Maritime Centers is necessary to allow accessory non-water-dependent uses. Many working coast uses require substantial revenues for maintenance of shorefront infrastructure, such as docks, piles, bulkheads, and navigation channels. Revenues generated by uses which are accessory to working coast uses can improve the economic viability of working coast uses and prevent total conversion of the site to non-water-dependent uses. However, state policies and standards must ensure that complementary non-water-dependent uses will not displace or interfere with the operations of working coast uses. Limited water-enhanced uses within Maritime Centers are also appropriate, but not at the expense of water-dependent uses.

- Improve and shorten the regulatory process.

  The following approaches should be considered to improve and shorten the regulatory process in Maritime Centers.

  The first approach is a general permit, administered by the Department of Environmental Conservation, for water-dependent commercial and industrial uses located in Maritime Centers. This permit could be the same as, or a slight variation of, the proposed State Program General Permit that is now being discussed by state agencies and the Army Corps of Engineers. The permit could allow a range of moderate improvements or routine maintenance activities to occur. This permit would not represent a new layer of regulation or be in addition to existing permits; rather, the general permit would consist of existing permits necessary for a coastal development project, such as tidal wetlands, water quality, and coastal erosion hazard permits. The various existing permits would comprise, and be folded into, one general permit. The permit would specify timeframes and project thresholds to guide the timing and scale of modest improvements or routine maintenance activities.

  The second approach is a general permit based on a state-approved Maritime Center plan. The timeframes and project thresholds of the general permit and an increased number of activities could be based on the Maritime Center plan. Actions in Maritime Centers covered by the general permit could be exempt from consistency review by the Department of State. A general permit could be an incentive to siting new water-dependent commercial and industrial uses in Maritime Centers.

  The third is a consolidated permit system for actions in Maritime Centers to shorten the regulatory process. Features of a consolidated permit system would be: a single

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application which is copied to, and reviewed by, all the involved state agencies; for major proposals, a pre-application meeting or scoping session with involved agencies; a single hearing; and issuance of one state agency permit and approval.

The fourth approach is continuing and expanding the use of Reconfiguration Perimeter Conditions that allow the alteration of reconfiguration of in-water structures, such as the number, width, length, and location of docks, piles, and ramps within the perimeter or envelope of an existing dock facility.

- Assign compatible water quality classifications.

  Ensure that water quality classifications and the associated "best usage of waters description" are compatible with existing water-dependent commercial and industrial uses, and if anticipated, the growth of new water-dependent uses. Surface waters in six of the ten proposed Maritime Centers are assigned the SB classification: Port Chester Harbor, Mamaroneck Harbor, New Rochelle Harbor, City Island, Port Washington, and Glen Cove. Surface waters in the Maritime Center of Port Jefferson (the southern most portion of the harbor) are assigned the SC classification.

  Surface waters in the remaining three Maritime Centers are assigned the SA classification: Huntington Harbor, Northport Harbor, and Mattituck Inlet. Consideration should be given to changing the classification from SA to SB in these three Maritime Centers in areas where concentrations of water-dependent commercial uses exist. Such a change in classification would be consistent with water quality classifications assigned to other Maritime Centers and be more compatible with water-dependent uses than the SA classification.

  Existing conditions, such as the following, could be used as the basis for reclassifying surface waters in Maritime Centers:

  - Due to poor water quality and the presence of actual or potential pollution sources, it is highly improbable that the area to be reclassified will ever be certified for shellfish harvesting.

  - The area to be reclassified must currently be uncertified for shellfishing purposes due to the presence of water-dependent uses that are potential or actual pollution sources.

  - The area is suitable for the development of water-dependent uses and does not exhibit habitat or natural resource characteristics that are suitable or conducive to the propagation of shellfish resources.

- Improve coordination of dredging and spoil disposal.

  Coordinate dredging actions in Maritime Centers to minimize individual regulatory and cost burdens and to minimize impacts to natural resources. Improved coordination will ensure safe, cost-effective navigation to and from Maritime Centers.

- Improve environmental quality.

  Maintaining existing, and fostering the development of new, water-dependent uses in Maritime Centers through reduced regulatory burdens and infrastructure investments does not mean a reduction in environmental quality. Best management practices will

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be applied to ensure that existing and new development will achieve improved environmental quality.

- Afford protection from nuisance suits.

  Protect pre-existing water-dependent commercial and industrial uses from nuisance suits by adjacent property owners.

- Work with local governments to complete Local Waterfront Revitalization Programs.

  The state should continue to work with local governments to complete Local Waterfront Revitalization Programs. An emphasis should be placed on completing local programs where there is a state-designated Maritime Center.

- Work with local governments to complete harbor management plans.

  Harbor management plans, as components of Local Waterfront Revitalization Programs, should be completed to address problems of conflict, congestion, and competition for space in the use of harbors, surface waters, and underwater lands in Maritime Centers. Harbor management plans will address the needs of water-dependent recreational, commercial, and industrial uses and ensure the orderly growth of water-dependent uses in Maritime Centers.

AREAS FOR CONCENTRATED DEVELOPMENT

Continued economic growth in appropriate locations is central to the vitality of the Long Island Sound region. One of the foremost purposes of the Long Island Sound Coastal Management Program is to achieve this objective by identifying Areas for Concentrated Development where state investments will be focused to spur private-sector-led redevelopment.

The following benefits are identified to justify the designation of Areas for Concentrated Development:

- Urban sprawl along the waterfront is discouraged since development can be channeled into and accommodated on already disturbed locations rather than in unspoiled or environmentally sensitive areas.

- Redevelopment provides opportunities to revitalize degraded areas and to restore some measure of environmental and visual integrity to a disturbed area.

- Existing infrastructure can be used more efficiently and provided at a lower cost than entirely new services at other locations.

- Redeveloping areas present opportunities to reestablish the public's connection to the waterfront by integrating public access into redevelopment projects.

- Redeveloping areas provide opportunities to introduce new uses that meet community and regional needs.

The concept of identifying target areas for concentrated development to protect natural resources and open space is similar to the efforts underway in other states where progressive land use management techniques are being used to guide development to desired locations.

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Such states include New Jersey, Maryland, Vermont, Florida, Oregon, Georgia, Maine, and Rhode Island.

REVITALIZING THE SOUND'S WATERFRONT CENTERS

Development actions in Areas for Concentrated Development should be viewed as a step toward restoring the man-made and natural environment in the Long Island Sound watershed. Sites that comprise Areas for Concentrated Development are located on or near Long Island Sound and consist mostly of blighted and underutilized lands. These lands, in their existing condition, are highly undesirable for economic, aesthetic, environmental, and public health and safety reasons and can be put to better uses. Harnessing regional growth and development pressures, along with the demand for specific uses, and channeling them into Areas for Concentrated Development, can eliminate deleterious conditions and new desired uses can be established. Development pressures are turned into opportunities for rejuvenating communities and improving the economy and environment.

Redevelopment can play an important role in local and regional economic growth by providing new commercial and residential uses, creating jobs, and expanding the tax base. Vacant or deteriorated waterfront lands provide opportunities to develop uses such as new marinas or other intensive waterfront uses which are likely to have limited future growth opportunities in the coastal area of the Sound. Redevelopment can boost growth in commercial and retail uses that provide goods and services to local businesses and consumers.

Fostering appropriate redevelopment in Areas for Concentrated Development by integrating commercial and retail uses with public open spaces and waterfront access will improve the quality of the waterfront, making it a more lively and diverse place for residents, workers, and visitors. An attractive waterfront will draw people to these areas, benefiting merchants and adding significantly to the quality of life in the local area and region. Areas upland or adjacent to Areas for Concentrated Development will also benefit. Nearby or adjacent neighborhoods will become more attractive places to live, and residents will benefit from their proximity to the redeveloped waterfront.

The Sound itself comprises the largest contiguous open space in the region providing relief from the built environment, particularly in the western half of the Sound. A redeveloped waterfront with increased public access and new activities will draw people to the waterfront and allow more people to enjoy the open space benefits the Sound provides.

The following goal and objectives statement for Areas for Concentrated Development was developed to provide a clear expression of the desired effect redeveloped areas will have on communities, the economy, the built and natural environment, particularly Long Island Sound, and people. The goal and objectives express a common vision for areas to be redeveloped, that when accepted by individuals, communities, and local, state, and federal government agencies, will facilitate the broad base of understanding and support required to redevelop Areas for Concentrated Development.

Goal and Objectives

The goal is to achieve redevelopment by pursuing desired and compatible uses in areas of concentrated development that revitalizes communities or discrete areas of a community, creates jobs and generates tax revenues, enriches the quality of life, advances environmental quality, and sustains the Long Island Sound region as a clean, inviting, and healthy place.

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Development and Economic Objectives

- Redevelop areas in context with community character and establish uses which are capable of substantially contributing to the economic base of the community and region.
- Implement appropriate design, development, and performance standards for all development, including public and private sector initiatives.
- Recognize the need for and facilitate private development which can help finance public improvements.
- Provide land uses such as residential, commercial, and retail along or near the waterfront, including uses which are dependent on or enhanced by a waterfront location.
- Ensure proper siting of water-dependent and water-enhanced uses and encourage redevelopment of existing public docks and piers as centers for maritime activity.
- Encourage development in areas currently served by available infrastructure and transportation systems, and coordinate infrastructure and transportation system improvements to target areas selected for high levels of use.

Environmental and Public Objectives

- Provide diverse land uses which are of interest to the public.
- In all public and private actions, protect and improve the positive elements of the built and natural environments and implement best management practices to restore the Sound.
- Maximize the use of publicly-owned waterfront property for the direct benefit and use of the public.
- Require public waterfront access to the Sound in all major development actions affecting the shoreline.
- Make public investments that will result in a clean and accessible waterfront.
- Accelerate remediation for hazardous waste sites in all Areas for Concentrated Development where a concentration of hazardous waste sites has been identified as inhibiting redevelopment.

Planning Principles

Well-conceived and well-constructed redevelopment will benefit the community and region and can advance the environmental quality of the Sound. Successful redevelopment will include the establishment of clearly defined places that have their own identity and function. New construction must recognize and be compatible with important cultural and natural features.

Planning principles to guide redevelopment include:

- Redeveloped areas will be of various scales and each should have a distinctive identity by taking advantage of unique man-made and natural characteristics. Redevelopment actions should be of a scale that conforms to the setting.

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- Redevelopment should build upon existing resources such as local history and important natural and man-made features to reinforce community identity and add to the sense of place. The waterfront should be a focal point of redevelopment actions.

- Redevelopment must respond to community and regional needs, the marketplace, and environmental constraints and opportunities.

To achieve successful redevelopment in Areas for Concentrated Development, performance standards and design guidelines must be established. Communities that contain Areas for Concentrated Development will need to ensure that the above planning principles, along with specific performance standards and design guidelines, are reflected in their Local Waterfront Revitalization Programs and implementing local laws. Specific standards and guidelines need to be established for each individual project in Areas for Concentrated Development.

Performance standards guide the type and density of land use of residential, commercial, industrial, recreational, and mixed uses. Standards that should be covered include allowable use, density, height, and requirements for open space and public access. Design guidelines provide the means for achieving design quality. Major topics that are covered include: site layout, walkways and promenades, visual quality, architecture, landscaping, streetscape amenities, and signs.

Definition and Criteria for Identifying Areas for Concentrated Development

The characteristics of Areas for Concentrated Development include: (1) urban waterfront areas; (2) locations where redevelopment serves as a catalyst for the redevelopment of a blighted or underutilized area or improves a deteriorated condition; (3) areas where infrastructure and transportation facilities exist; or (4) locations where redevelopment can advance the New York State Coastal Management Program in terms of public access, the retention and expansion of water-dependent uses, or the facilitation of new economic activities appropriate to the region.

An Area for Concentrated Development is defined as a waterfront area that is part of or near a business district and contains blighted or underutilized properties which are adequate in size to accommodate significant redevelopment. Redevelopment actions shall result in a majority of the following: a restored and revitalized waterfront or adjacent inland area; a strengthened local and regional economy through the development of commercial, industrial, and residential uses; improved waterfront recreation opportunities, public access, or dockage; improved views to the waterfront; restored and preserved historic sites; improved environmental quality; enhanced community character and sense of place; and enhanced visiting pleasure. In their geographic scope, Areas for Concentrated Development will generally be a discrete area of a community, not the entire community.

The criteria to determine whether an area, which meets the above definition, is selected as an Area for Concentrated Development are:

- **Community Initiative and Commitment**: The community demonstrates initiative and commitment to undertake and follow through on major redevelopment projects to improve the area. The local government demonstrates an interest in, and commitment to, significantly improving the community's waterfront or business district through an expression of one or more of the following: citizen support and consensus; plans

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which demonstrate sound economic development and land/water use objectives; or preparation of preliminary waterfront inventories and design plans.

- **Local Planning**: The community has an approved Local Waterfront Revitalization Program (LWRP) or is actively preparing a LWRP. A LWRP provides the local comprehensive land use planning context for redevelopment.

- **Adequate Land and Water Use Controls**: The community has, or will have in place, adequate land and water use controls to manage the use, density, and location of development. These controls are necessary to ensure that the size, scale, and intensity of uses generated by redevelopment are appropriate and compatible with the landside and waterside character of the community.

- **Land and Water Use Optimization**: New development will generally improve the environmental quality of the area. New development will make optimal use of the area's land and water resources which include the built and natural environments, land and water uses, community character, and infrastructure, with particular attention to providing water-dependent and water-enhanced uses.

- **Infrastructure**: Infrastructure and transportation systems exist which are adequate to service the proposed redevelopment. If the existing systems are inadequate, they can be repaired or upgraded to satisfactorily service the intended redevelopment.

- **Economic Growth**: Opportunities exist to stabilize or improve the local and regional economy through redevelopment projects. The area can accommodate a significant increment in growth and development. Redevelopment opportunities exist to achieve economic growth and diversity on the local and regional level through the development of a range of appropriate uses.

- **Opportunities to Restore and Redevelop**: Sufficient development demand exists which can be channelled to areas for redevelopment. These development pressures can be used as opportunities to restore and redevelop significant blighted or underutilized areas, buildings, land, waterfronts, or neighborhoods through appropriate redevelopment.

- **Public Access**: Public access can be improved by enhancing existing public access or by establishing new public access. Opportunities exist to establish: public open spaces on the waterfront which allow a wide range of recreational uses, waterfront recreation facilities and features to attract people to the waterfront, or an access circulation system that links waterfront areas and the business district to the waterfront.

- **Community Needs**: The area to be redeveloped will serve community needs as an activity center for a range of cultural, living, employment, recreational, and educational opportunities. The redeveloped waterfront can be established or improved as a place for people to gather, socialize, recreate, or work. Redevelopment will result in the addition of new public or semi-public facilities or improvements to existing facilities.

- **Regional Significance**: The area can accommodate a significant level of new development and is, or has the potential to be, a waterfront area of regional or statewide significance. Redevelopment in the area will make major contributions to the region for retention or expansion of water-dependent uses or expansion of economic activities appropriate to the region.

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Long Island Sound's Areas for Concentrated Development

The following communities are designated as Areas for Concentrated Development since they meet the definition and criteria. These communities represent an initial selection of Areas for Concentrated Development and are not a final list. Additional Areas for Concentrated Development are likely to be recommended by state and local agencies and the public. See map 21.0.

The project descriptions are from Local Waterfront Revitalization Programs (LWRP) and are meant to provide a general description of potential redevelopment projects that exist. These descriptions are not meant to provide a detailed discussion of site-specific projects.

The Village of Port Chester

The Village of Port Chester, with two miles of waterfront on the Byram River and Port Chester Harbor, is located in the southeastern portion of Westchester County, ten miles north of the Bronx and west of Greenwich, Connecticut.

The village and its waterfront was an industrial center for many years, the peak period of industrial activity being from 1910 to 1930. The village's popularity as an industrial center was due in large part to the efficient transportation network consisting of the Byram River, the Old Boston Post Road, and the railroad. After World War I, waterfront industrial use began declining to be replaced by residences and parking lots. The construction of two interstate highways, which caused people and goods to bypass the village, further contributed to decreases in waterfront industrial activity and an overall decline of the downtown. As a result, major redevelopment opportunities exist in the form of underutilized or vacant property on the waterfront and near the central business district.

Criteria Met for Designation

Port Chester meets the Area for Concentrated Development definition since: (1) four underutilized, large tracts of land, ranging from one to 23 acres, have been identified for major redevelopment by village officials; (2) the sites are located in the waterfront area in or near the village's business district; and (3) redevelopment actions will achieve a majority of the objectives contained in the definition.

The village has demonstrated initiative and commitment to undertake and follow through on redevelopment projects in the waterfront area. The village's redevelopment plans are described in the Port Chester Local Waterfront Revitalization Program (LWRP), voluntarily prepared by the village, that has received local, state, and federal approval. The village's approved LWRP provides the comprehensive planning context for redevelopment. The village-sponsored and -approved Marina and Downtown Redevelopment Project is a priority project that has gone through the State Environmental Quality Review process and found to be consistent with the LWRP. Three other redevelopment projects are advancing through design or approval processes. Public participation has occurred through public hearings on the LWRP and for individual projects.

Port Chester adopted adequate land and water use controls to ensure that the type, size, scale, and intensity of redevelopment is compatible with the community. The proposed uses are expected to stabilize, and moderately expand, the existing central business district. The areas to be redeveloped will provide uses that are desired by the community including office, retail, residential, parking facilities, marinas, and parks. By identifying sites for redevelopment, the village has established that Port Chester will allow significant new growth as long as new

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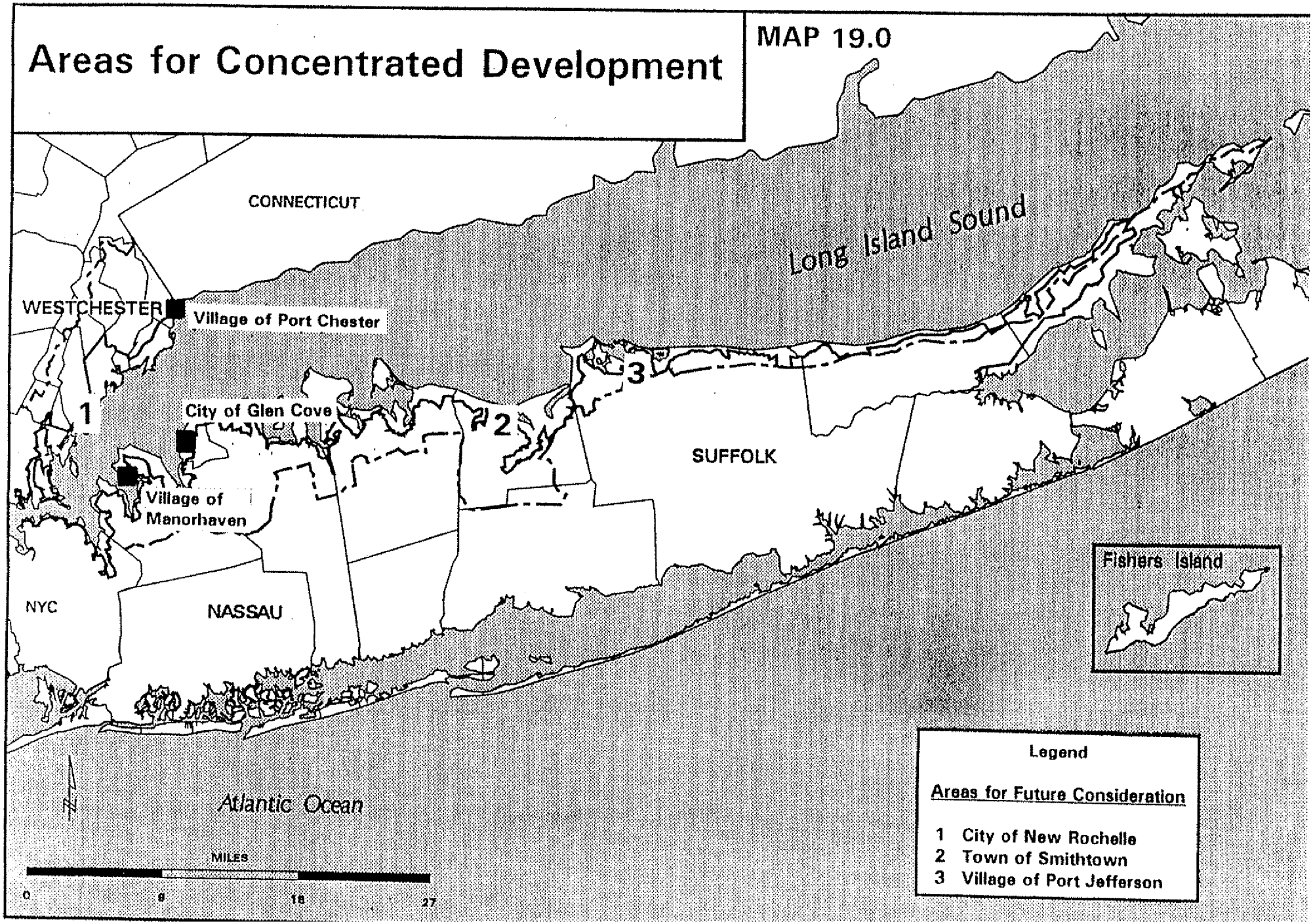
Areas for Concentrated Development

MAP 19.0



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development is consistent with the village's redevelopment objectives. The village's existing infrastructure and transportation systems will be improved or upgraded at project sites to accommodate the proposed redevelopment. By redeveloping in a built area, optimum use will be made of existing infrastructure.

Redevelopment will achieve economic growth that will benefit the local and regional economy by establishing a variety of new desired uses, an increase in tax revenues from new commercial and residential development, and the creation of construction and permanent jobs. Redevelopment will also improve the quality of Port Chester while having minimal on-site impacts since the sites targeted for redevelopment are in a deteriorated or disturbed condition. Developing these sites will help to contain development, minimize urban sprawl, and relieve local and regional growth pressures. Best management practices will be implemented when properties are redeveloped to minimize nonpoint source runoff to Port Chester Harbor and the Byram River.

Public access to and along the Byram River will be improved through renovations to the existing Byram River Marina, the development of two new marinas, and a waterfront promenade. These projects will improve existing public access and provide new public access at waterfront locations not currently providing access.

Port Chester has been identified as a Maritime Center of regional importance. Redevelopment actions will ensure the retention and expansion of marinas through improvements to an existing public marina and the development of new marinas.

Port Chester's Area for Concentrated Development

The Village of Port Chester's LWRP contains descriptions of major urban renewal projects that will improve and reshape its waterfront. Development is proposed to be sited on extensive vacant and underutilized parcels that would result in minimal impacts on the natural environment. Village officials envision and have planned for redevelopment to transform their village from a decayed former industrial and commercial center to a full-service village with an emphasis on marine recreation. To achieve this, the village intends to make better use of the extensive underutilized and vacant property for marine recreation use, public access and open space, residences, offices, and retail shops. Approximately 75 percent or 1.5 miles of the village's waterfront are targeted for redevelopment.

The priority projects are shown on map 22.0 and include the following:

- The Marina and Downtown Redevelopment

  This project calls for the construction of offices, a wide range of retail shops, residential apartments, the reconstruction of an existing marina to provide 150 slips, and a public promenade. Central to this redevelopment objective is improving the connection and relationship with the village's central business district which is adjacent to the waterfront.

- Columbus Park Marina

  This project entails the construction of a 200-slip public marina under I-95, boat storage, a boat ramp, and public parking.

- Affordable Housing

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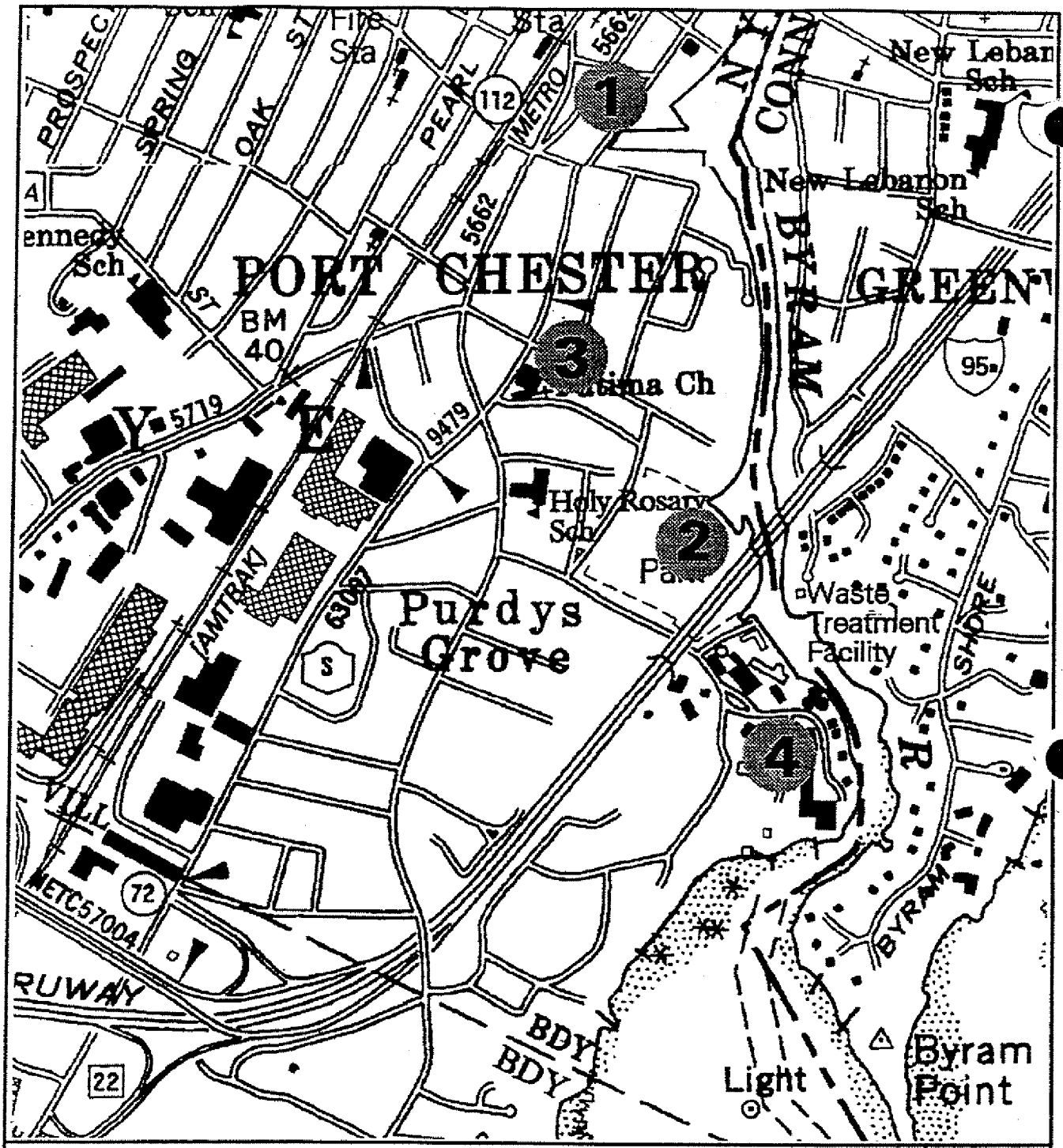

AREA FOR CONCENTRATED DEVELOPMENT: Port Chester Waterfront
Village of Port Chester
Westchester County

PROJECT KEY:
1. Marina and Downtown Redevelopment
2. Columbus Park Marina
3. Affordable Housing
4. Residential and Marina Project

Scale 1:9600
(1" = 800')

MAP 20.0

This project entails the creation of 60-plus affordable housing units at Purdy and Traverse Avenues for senior citizens and families.

- The Harbor Park Marina

  This project, located near the south end of the village, calls for predominately residential townhouses and multi-family units at an average density of 25 units per acre, limited retail shops, approximately 200 boat slips with 100 slips for public use, a public waterfront walkway, and other public amenities.

Sewage Treatment

Sewage generated by new development would be treated by the Port Chester wastewater treatment plant which is linked to the Blind Brook wastewater treatment plant located in the City of Rye. The Long Island Sound Study (LISS) indicates that both plants, which are operated by Westchester County, are being evaluated for denitrification. The wastewater treatment plant in Port Chester does have some excess capacity, but it is anticipated that this capacity would be significantly reduced or eliminated when modifications are made for nitrogen removal to achieve the "no net increase policy" for nitrogen discharges as established by the LISS. The LISS initial infrastructure project list includes an estimate of $200,000 for a biological nutrient removal retrofit at the Blind Brook treatment plant to reduce nitrogen loading to the Sound. New development within the Port Chester Area for Concentrated Development cannot result in an increase in the nitrogen loading to the Sound. Capacity at the Port Chester and Blind Brook wastewater treatment plants may need to be increased to accommodate new development.

The Village of Manorhaven

The Village of Manorhaven, with approximately two miles of waterfront on Manhasset Bay, is located in northwest Nassau County five miles east of the municipal border between Queens and Nassau counties.

Manorhaven was known during the 1950's as a waterfront resort community for people from New York City. Many summer homes that were built years ago have become permanent residences as the village has evolved into a year-round community. The waterfront consists mostly of marinas, yacht clubs, parkland, single family homes and condominiums, and a deteriorated former ferry dock site. Manhasset Isle, once famous for its seaplane facility, now abandoned, is developed with single family homes, marinas, and some manufacturing and retail stores. The former sea plane facility, known as the Thypin Steel property, represents the major redevelopment opportunity.

Criteria Met for Designation

Manorhaven meets the Area for Concentrated Development definition since: (1) three underutilized sites exist, ranging in size from one to ten acres, that have been identified for major development by village officials; (2) the sites are located on the waterfront near or in the village's business district; (3) and redevelopment will achieve most of the objectives described in the definition.

The Village of Manorhaven has demonstrated initiative and commitment to undertake and follow through on redevelopment projects. The Manorhaven LWRP was voluntarily commenced by village officials and provides the comprehensive land use planning context for redevelopment. The LWRP describes three underutilized sites, redevelopment plans for

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each site, and plans to improve public access and restore wetlands. Based on the LWRP, village officials obtained local support to purchase underutilized waterfront land to construct a park and improve public access, applied for a wetlands restoration grant, and plan to have feasibility studies prepared to establish the most appropriate use for two underutilized sites. Public participation is ensured through an LWRP advisory committee, including citizens and business owners, that oversees the preparation of the LWRP.

The village intends to adopt land and water use controls to ensure that the type, size, scale, and intensity of redevelopment are compatible with existing uses. Redevelopment will improve the quality of the Manorhaven waterfront and business district by introducing desired community uses including residential, retail, marina, and recreation. These new uses will have minimal on-site impacts since the sites targeted for redevelopment are in a deteriorated or disturbed condition. By identifying sites for redevelopment, the village has established that significant new development will be allowed, so long as new development is consistent with the village's redevelopment objectives and improves the quality of the Manorhaven waterfront. Redeveloping in a built area will make optimum use of existing infrastructure which is expected to be adequate to accommodate redevelopment.

Redevelopment will achieve economic growth that benefits the local and regional economy by: establishing new desired uses, increasing tax revenues from new commercial and residential development, and creating construction and permanent jobs. Developing these sites will help to contain development, minimize urban sprawl, and relieve local and regional growth pressures.

Public access opportunities to and along Manhasset Bay will be improved through the creation of a park and marina at the Morgan Ferry Dock, the development of new marinas or water-dependent uses on Lot 778, provisions for waterfront recreation facilities at the Thypin Steel property, and the development of a waterfront promenade that will parallel North Sheets Creek and Manhasset Bay. These projects will improve existing public access and provide new public access at waterfront locations not currently providing access.

Manorhaven, as part of Port Washington, has been identified as a Maritime Center of regional importance. Redevelopment actions will improve Manorhaven as a boater's destination and result in the retention and expansion of marine recreational uses.

Manorhaven's Area for Concentrated Development

The Village of Manorhaven has been active in preparing its LWRP since shortly after volunteering to prepare the plan in June 1992. Village officials intend to improve Manorhaven as a boater's destination by expanding services for boaters and improving the visual quality of the waterfront to attract increased numbers of visitors and boaters to boost the local economy. To achieve this, the village intends to redevelop three deteriorated parcels, restore two wetlands, and improve public access to the waterfront. Approximately one-half of the village's one mile waterfront will be affected.

The priority projects are shown on map 23.0 and include the following:

- Morgan Ferry Dock

  To redevelop the deteriorated Morgan Ferry Dock property for public use as a waterfront park, a small marina and mooring for 100 resident and transient vessels, and a fishing pier. The site is one acre in size and publicly owned.

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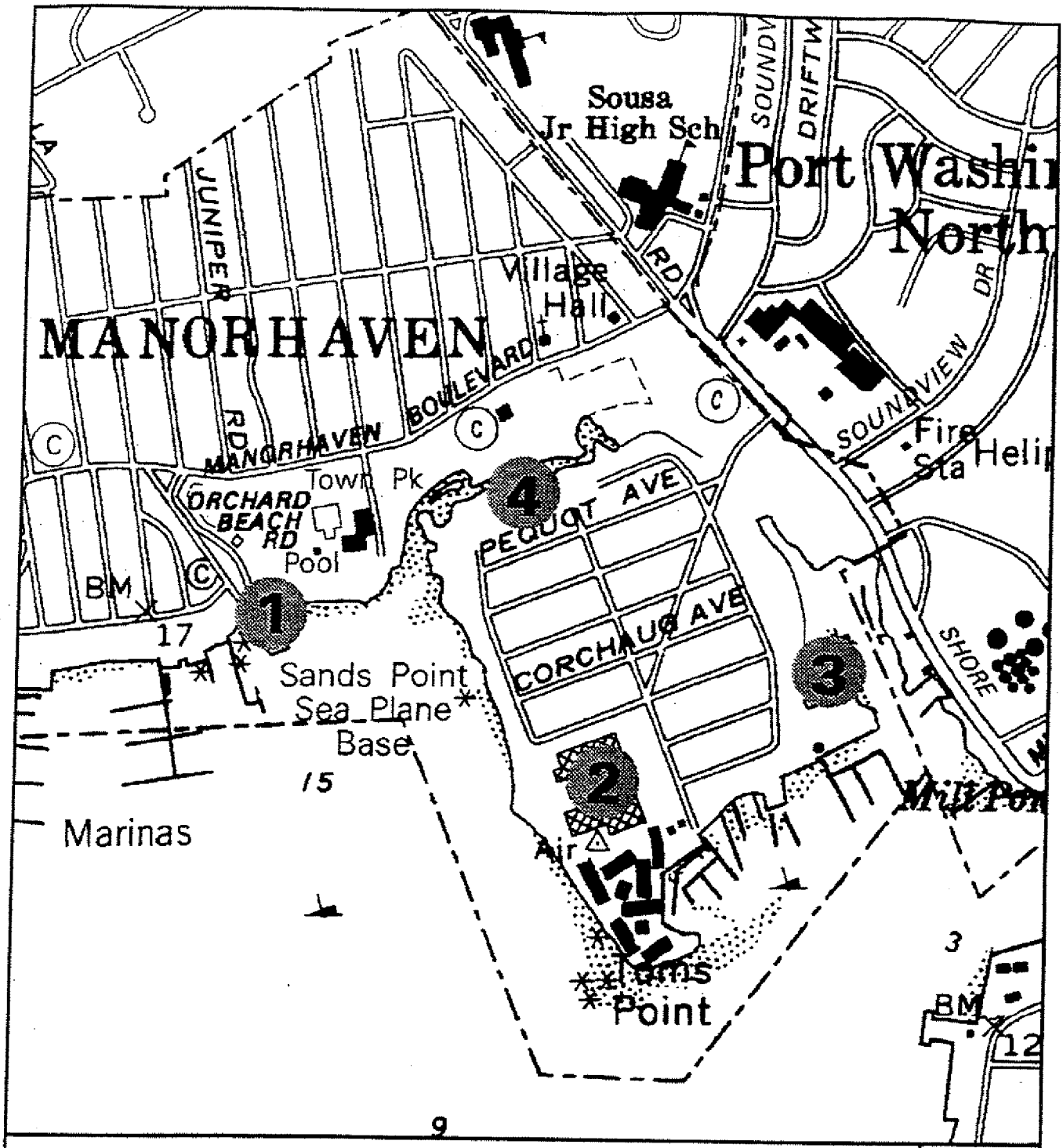

AREA FOR CONCENTRATED DEVELOPMENT: Manorhaven Waterfront
Village of Manorhaven
Nassau County

PROJECT KEY:
1. Morgan Ferry Dock
2. Thypin Steel Property
3. Lot 778
4. Wetland Restoration

MAP 21.0

Scale 1 : 9600
(1" = 800')

- Thypin Steel Property

  To redevelop the Thypin Steel property for a mix of uses including residential, hotel (to provide overnight lodging for boaters), and retail. The site is 10 acres in size, contains a deteriorated four story building, and is privately owned.

- Lot 778

  To remove barges and marine debris from a two-acre publicly owned parcel and redevelop the site for water-dependent uses. The removal of the debris would enable the upland property owners or the public owner (ownership of the site remains unclear) to make better use of the location with water-dependent uses.

- Wetland Restoration and Public Waterfront Access

  To restore the wetland and habitat values of North Sheets Creek marsh and East Sheets Creek marsh by removing debris, minimizing pollutants entering the creek from overland runoff and street drains, and re-establishing wetland vegetation. A waterfront walkway is planned that would connect the marine commercial waterfront area to the nearby neighborhood business district by passing through public waterfront parkland located on the north edge of North Sheets Creek, and possibly continuing around to the south edge.

Sewage Treatment

Sewage generated by new development would be treated by the Port Washington wastewater treatment plant which has no excess capacity. The Long Island Sound Study's (LISS) initial infrastructure project list includes a cost estimate of $16 million for denitrification for Port Washington's wastewater treatment plant to achieve the "no net increase policy" for nitrogen discharges, as established by the LISS. New development within the Manorhaven Area for Concentrated Development cannot result in an increase in the nitrogen loading to the Sound. Capacity at the Port Washington wastewater treatment plant may need to be increased to accommodate new development on the Manorhaven waterfront.

The City of Glen Cove

The City of Glen Cove is located in northwest Nassau County seven miles east of the border between Queens and Nassau counties. The city has approximately eight miles of waterfront on Hempstead Harbor and Long Island Sound, including Glen Cove Creek which is one mile long.

For many years, from the mid-1800's to the early 1900's, Glen Cove was a resort community for wealthy New York City residents. However, during approximately this same period, and to a lesser degree since, industrial uses have been located on Glen Cove Creek. Today, primarily as a result of industrial activity, the creek is heavily contaminated with toxic and hazardous wastes. The geographic extent and the level of contamination are not known; investigations by the state and the U.S. Environmental Protection Agency (USEPA) are ongoing. To date, six inactive hazardous waste sites, totaling close to 50 acres, have been identified and are undergoing remediation by the New York State Department of Environmental Conservation and USEPA. The sites, which are shown on map 24.0, include: (1) Captain's Cove Condominiums, (2) Mattice Site, (3) Edmos Corporation, (4) Li Tungsten, (5) Konica Imaging, and (6) Crown Dykman. Because of the contamination, there

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are many vacant or abandoned sites on Glen Cove Creek and the remaining sites are developed with industrial uses, marinas, or municipal facilities.

Glen Cove Creek, once a tidal estuary, was transformed into a navigation channel by the U.S. Army Corps of Engineers in 1929. At that time, the City of Glen Cove transferred title to the creek to the Army Corps of Engineers in return for routine dredging of the channel at 10-year intervals. The creek has not been dredged in years because it is believed that the sediments are also heavily contaminated. The creek has silted in to the degree that it is unnavigable at low tide. Dredging Glen Cove Creek is imperative for it to be navigable and for the Glen Cove Creek area to meet its potential as an Area for Concentrated Development and a Maritime Center.

Criteria Met for Designation

The City of Glen Cove meets the Area for Concentrated Development definition since: (1) six underutilized sites, totaling close to 50 acres, have been identified for redevelopment; (2) the sites are located on or near Glen Cove Creek near the city's business district; and (3) redevelopment actions will achieve a majority of the items in the definition. A priority action, and a major impediment to redevelopment until completed, is the need to assess the full extent of hazardous waste contamination in the Glen Cove Creek area and complete remedial action plans.

The City of Glen Cove has demonstrated initiative and commitment to redeveloping the Glen Cove waterfront. The city voluntarily prepared its Local Waterfront Revitalization Program which provides the comprehensive planning context for redevelopment on Glen Cove Creek. However, near the time the city thought it had completed its LWRP, sites heavily contaminated with hazardous waste were identified in the Glen Cove Creek area which delayed completion of the LWRP.

The city is expected to adopt adequate land and water use controls necessary to ensure that the type, size, scale, and intensity of redevelopment are compatible with the community. The areas to be redeveloped along the creek will provide desired uses such as retail, residential, restaurants, office, parking facilities, marinas, ferry services, parks, and other similar uses. Redevelopment is expected to stabilize and moderately expand the existing central business district which is located just east of the creek. Redevelopment will improve the quality of Glen Cove while having minimal on-site impacts since the sites targeted for redevelopment are contaminated with hazardous waste and contain abandoned structures. By identifying Glen Cove Creek as an area for redevelopment, city officials have established that significant new growth will be allowed as long as new development is consistent with the city's redevelopment objectives and improves the quality of the waterfront area. By redeveloping in a built area, the city will make optimum use of existing infrastructure which may need to be improved or upgraded to accommodate redevelopment.

Redevelopment will achieve economic growth that will benefit the local and regional economy by: establishing a variety of new uses, increasing tax revenues from new commercial and residential development, and creating construction and permanent jobs. Developing these sites will help to contain development, minimize urban sprawl, and relieve local and regional growth pressures.

Open space and public access are important uses along the creek. Public access opportunities to and along the Glen Cove Creek could be improved by the development of a waterfront promenade that would provide new public access at waterfront locations not currently

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accessible. Walkways should be established from the creek to the city's central business district and possibly link to Garvies Point Preserve.

Glen Cove has been identified as a Maritime Center of regional importance. Redevelopment actions will encourage the development of water-dependent and water-enhanced commercial uses.

Glen Cove's Area for Concentrated Development

The city is working with the Department of State to complete the City of Glen Cove LWRP. The city desires to transform the creek from a severely contaminated area to a usable corridor for recreation, marinas, and other uses that would complement the city's nearby central business district. Should clean-up efforts occur on a reasonably timely basis, the creek represents a prime opportunity for redevelopment. Currently no specific redevelopment proposals exist for the creek. It is unlikely that private investments will be made until the extent of contamination is established, remedial action plans are underway, and the creek is dredged, which is imperative if the creek is to be made navigable at low tide. Public investments in the form of remedial action are necessary before private sector investments will occur.

The priority projects are shown on map 24.0 and include the following:

- Hazardous Waste Assessment and Remediation

  To determine the geographic extent and level of contamination on the upland and in the navigation channel and proceed with remediation.

- Redevelop the Creek With Appropriate Uses

  Consistent with remediation actions, dredge the creek and develop the vacant sites with appropriate uses. Dredging should not be delayed until after the hazardous waste sites have been fully remediated. Improve the connection and relationship between the creek and the downtown business district.

Sewage Treatment

Sewage generated by new development would be treated by the City of Glen Cove wastewater treatment plant. Glen Cove's wastewater treatment plant has some excess capacity but it is anticipated that this capacity would be significantly reduced or eliminated when modifications are made for nitrogen removal to achieve the "no net increase policy" for nitrogen discharges as established by the Long Island Sound Study. The Long Island Sound Study Comprehensive Conservation Management Plan initial infrastructure project list includes an estimate of $14 million for full-scale denitrification for Glen Cove wastewater treatment plant. New development in the Glen Cove Area for Concentrated Development will have to be accommodated without increasing the 1990 nitrogen loading to the Sound in accordance with the "no net increase policy."

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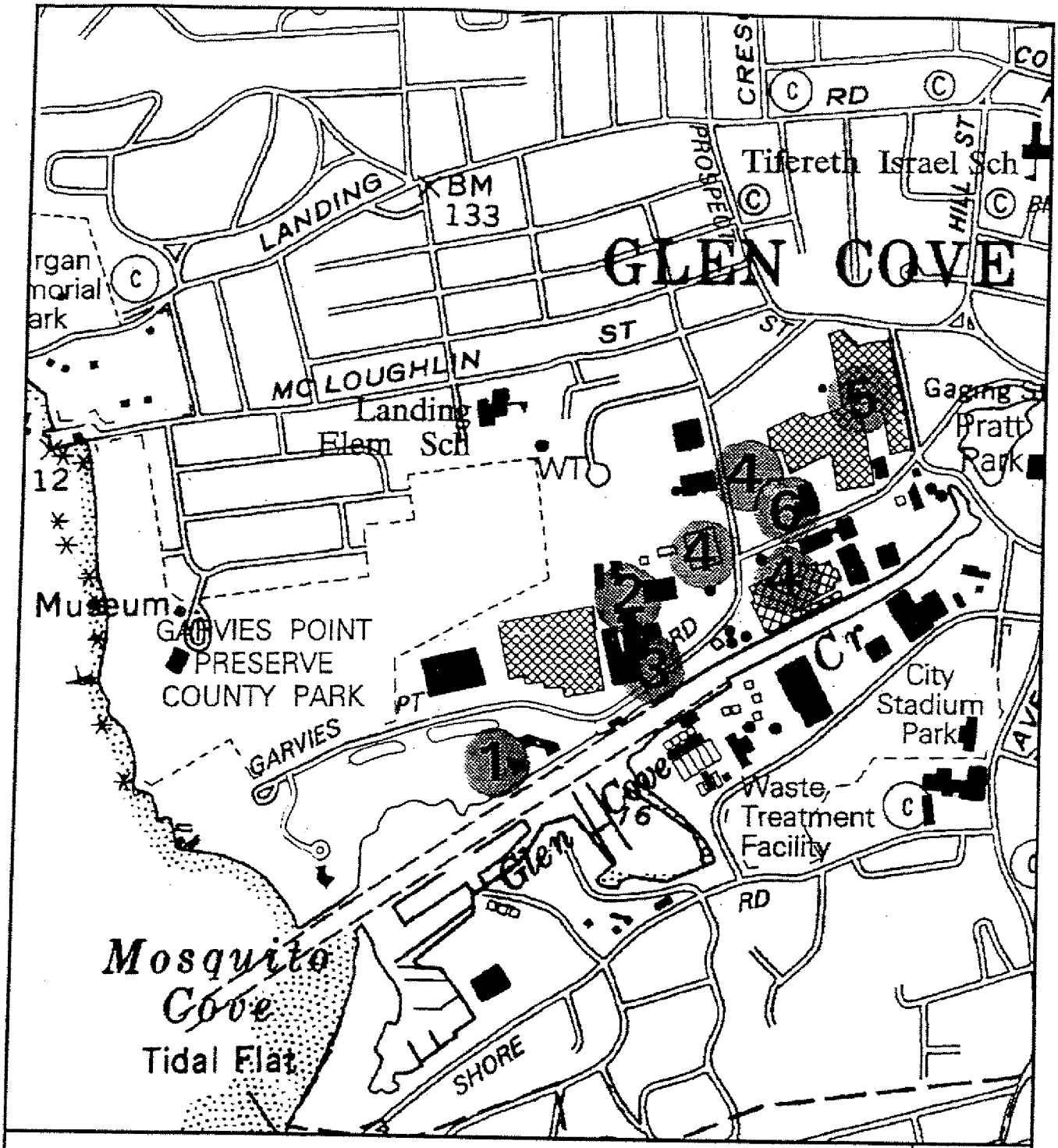

AREA FOR CONCENTRATED DEVELOPMENT: Glen Cove Creek
City of Glen Cove
Nassau County

PROJECT KEY: Complete hazardous waste assessments, remediation and redevelop remediated sites with appropriate uses.

1. Captain's Cove Condominiums
2. Mattice Site
3. Edmos Corporation
4. Li Tungsten
5. Konica Imaging
6. Crown Dykman

MAP 22.0

Scale 1 : 9600
(1" = 800')

Communities for Future Consideration

Additional communities that are good candidates for Areas for Concentrated Development include:

The City of New Rochelle

The City of New Rochelle is located in the southeast corner of Westchester County and has close to nine miles of shoreline on New Rochelle Harbor and Echo Bay. New Rochelle has long been known as a major recreational boating center on the Sound and remains that way today. The city's waterfront area is developed with single and multifamily residential uses, several large and small waterfront parks, and many private beach clubs, yacht clubs, and marinas. The downtown area is not adjacent to the waterfront but is located near the waterfront only a few blocks away. A significant amount of underutilized urban land exists on or near the waterfront upon which a variety of water-dependent and non-water-dependent uses can be located. Redevelopment efforts are also targeted for the city's downtown area where there is considerable vacant office and retail space. City officials desire to invigorate New Rochelle and enhance its image as a recreational boating center by redeveloping vacant or underutilized waterfront parcels affecting approximately three miles of the city's waterfront.

The Town of Smithtown

The Town of Smithtown is located in the northwest section of Suffolk County and has approximately 35 miles of shoreline on Smithtown Bay, Stony Brook Harbor, and the Nissequogue River. The waterfront area, which is mostly developed, consists of residences, parks, a modest number of marinas and yacht clubs, and a limited number of retail uses. Concentrations of commercial and industrial uses are located in the central and southern portions of the town near the Long Island Expressway and the Northern State Parkway. The King's Park Psychiatric Center, located southwest of the entrance to the Nissequogue River, is a large state-owned institution on approximately 565 acres of land in the town's waterfront area. This facility has major redevelopment potential. Prior to the state's deinstitutionalization policy, the King's Park Psychiatric Center had a group quarters population of over 600 persons. The resident population is now only a small percentage of its peak capacity. A master plan, based on the town's approved Local Waterfront Revitalization Program, is being prepared by the state in cooperation with the town for the future use of the property. Conversion of the property for a variety of uses or mixed use development is being considered such as residential, institutional, recreation and open space. The town desires to ensure that reuse of this property will not adversely impact the community and the character of the area.

The Village of Port Jefferson

The Village of Port Jefferson is located near the mid-portion of Suffolk County and has close to two miles of waterfront. Land uses in the waterfront area include water-dependent commercial and industrial uses, retail, and residential. Port Jefferson Harbor has been transformed, in a short period of time, from a harbor that was once used mainly for water-dependent industrial uses such as shipbuilding, petroleum transfer and storage, and aggregate transshipment to a harbor area that has become popular for recreational boating and tourists. Marinas and other uses that serve visitors such as hotels, restaurants, and retail shops have replaced many of the industrial uses. Village officials desire to further improve Port Jefferson as a destination point for visitors by providing additional marine recreation facilities

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and hotel accommodations and improving the visual quality of, and access to, the waterfront. The village wants to achieve these objectives without adversely affecting the historic and scenic qualities of the village.

ADVANCING PROJECTS IN AREAS FOR CONCENTRATED DEVELOPMENT

Examples of the types of assistance that could be used to advance redevelopment actions in Areas for Concentrated Development include funds for marketing and feasibility studies, land surveys, design and engineering plans, construction drawings, land acquisition and assemblage, hazardous waste site analysis and remediation, infrastructure improvements, wastewater treatment plant improvement, construction, and natural resources restoration.

Immediate needs in the Village of Port Chester are funds for infrastructure improvements for the Marina and Downtown Redevelopment Project. New water and sewer lines are needed to serve the new retail, office, and residential uses. Funds are also necessary to repair and expand the existing marina.

In the Village of Manorhaven, priority needs are for funds to transform the Morgan Ferry Dock property to a marina and waterfront park, to complete feasibility studies for a mixed use development on the Thypin Steel property and reuse of Lot 778, and to restore wetlands and mitigate stormwater discharges in North Sheets Creek.

Priority needs in the City of Glen Cove are for the continuation of hazardous waste assessments and remediation of properties on and near Glen Cove Creek.

Technical assistance teams could be used to assist communities in achieving their redevelopment objectives. A technical assistance team of knowledgeable coastal management experts could be established in each coastal region consisting of designated representatives from various state agencies. The team leader could be a technical assistance coordinator who would draw upon the resources of other entities to ensure that the technical assistance needs of communities and coastal resource users are met. A team could be assembled to assist communities in implementing redevelopment plans for Areas for Concentrated Development by: expediting provisions for technical assistance and information, assisting in defining project development needs, ensuring that redevelopment project actions receive priority attention within a particular agency, and facilitating permit processing.

Existing state programs can be of assistance in advancing redevelopment actions in Areas for Concentrated Development. The following program summaries represent a sampling of the types of programs which may be the most helpful to advance projects in Areas of Concentrated Development. These program summaries are based on material provided by: the NYS Department of Economic Development, principally the state's Economic Development Plan: Strategies and Initiatives for 1993-1996 and A Guide To New York State Economic Development Resources; the NYS Department of Transportation; and the NYS Department of Environmental Conservation.

Empire State Development Corporation (ESDC): ESDC assists in planning and stimulating development in communities. Program assistance is available primarily to local development corporations, other not-for-profit economic development corporations, and municipalities undertaking projects to stimulate the economic development of urban and commercial areas. A main feature of ESDC is to provide assistance to local economic development organizations to help them analyze, plan for, and implement development projects in their

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communities. Although ESDC has programs which are available for eligible projects in all communities, many programs give preference to distressed communities.

Economic Response Team: Through the Department of Economic Development and the Long Island Partnership, Economic Response Teams could be assembled to address economic opportunities in Areas for Concentrated Development and other locations in the Long Island Sound region. Economic Response Teams are typically used to respond to specific company inquiries and to address issues of business retention and expansion, mostly for manufacturing businesses.

Economic Development Zones Program: The purpose of this program is to target economically impoverished areas in order to stimulate private investment, business development, and job creation. The program works with distressed communities with serious economic need (based on unemployment, poverty and economic distress statistics) and demonstrated commitment to revitalizing their communities. The program encourages business development by offering new and expanded businesses a combination of tax credits, reduced utility rates, low interest loans, and priority attention from state agencies. Through this type of targeted assistance, it is expected that new businesses will be created and expanded and chronic trends of community distress will be reversed. Nineteen communities have been designated; a total of 40 communities are expected to be designated. Communities with designated Areas for Concentrated Development may meet the criteria.

Environmental Facilities Corporation (EFC): The EFC is the primary provider of environmental infrastructure assistance in the state. The EFC provides technical and financial assistance to municipalities, the private sector, and state agencies to build or expand environmental infrastructure. Low interest rate loans are made available to municipalities through the New York State Revolving Loan Fund for water pollution control projects. Most loans have financed point source projects, such as sewer system and waste water treatment plant improvements. Recently, low interest rate loans have been made available through the State Revolving Loan Fund for projects that will protect water resources from nonpoint source pollution.

Environmental Protection Fund (EPF): The recently established EPF identifies projects and programs eligible for funding including: open space land conservation; non-hazardous landfill closure; controlling nonpoint source pollution; municipal waste reduction and recycling; park, recreation, and historic preservation; and local waterfront revitalization programs and coastal rehabilitation.

NYS Department of Transportation Industrial Access Program: This program provides state funding for highway and bridge improvements which will facilitate economic development by providing or improving access to industrial or agricultural facilities. The transportation improvements must result in jobs being created or retained in New York State. The creation or retention of jobs and investment are primary criteria. Sixty percent of assistance is offered as a grant; the balance, as a no-interest loan over five years.

Federal Transportation Enhancements: Various types of "transportation enhancement" projects such as pedestrian facilities, landscaping, and historic preservation are eligible for funding if they have a direct relationship to intermodal transportation system improvements. Funding for transportation enhancements is from the National Intermodal Surface Transportation Efficiency Act, the purpose of which is to develop a national transportation system that is economically efficient, environmentally sound, provides the foundation for the

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nation to compete in a global economy, and will move people and goods in an energy efficient manner.

State Superfund Program: The purpose of this program is to provide funds to remediate inactive hazardous waste sites. The remedial action process consists of: a thorough site investigation to determine the length, depth, and width of contamination; enforcement; remedial action selection; design; and construction. DEC is conducting a site investigation on Glen Cove Creek to determine the extent of contamination. It is anticipated that since at least six sites are contaminated, the creek may be designated as one large Superfund site.

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OUTSTANDING NATURAL COASTAL AREAS

Within each of Long Island Sound's ecological complexes lie coastal areas that host outstanding arrays or significant examples of natural elements or ecological communities. In many cases, the natural resources of these areas have attracted human use from prehistoric times.

The LIS CMP identifies three Outstanding Natural Coastal Areas (ONCAs) to focus state agency efforts in protection, enhancement, and restoration. The LIS CMP also presents information on ten additional areas for consideration.

THE NEED FOR NATURAL AREA MANAGEMENT

Natural coastal landscapes and the plants and animals that they support enrich the quality of life enjoyed by residents and visitors to the Sound, but ensuring that these resources can thrive or even be sustained in areas that are under increasing pressure from development is difficult. Protection programs, whether for natural areas or for built resources, such as historic structures, generally focus on the specific resource and do not always incorporate the broader area that adjoins and influences the viability of the resources.

Ecological communities cannot be viewed in isolation from one another. They are part of, and interact with, larger landscapes and ecological systems containing a myriad of elements. Because these elements interact and are interdependent, their management must be addressed in an integrated, holistic manner. The Outstanding Natural Coastal Areas are designed to define primary areas of concern within which management efforts will be concentrated to protect and enhance the individual resources and larger natural landscapes of Long Island Sound.

IDENTIFICATION OF OUTSTANDING NATURAL COASTAL AREAS

Outstanding Natural Coastal Areas are defined geographic areas within the Long Island Sound coastal boundary and generally are composed of a variety of smaller, natural ecological communities that together form a landscape of environmental, social, and economic value to the people of New York. An ONCA must meet the following three criteria:

Criterion 1: The area contains significant natural resources.

An area must first qualify as an ONCA on the basis of its natural resources. The natural resources of the area are significant to the coastal region if they contain assemblages or outstanding examples of natural ecological communities; fish or wildlife habitat; endangered, threatened, or rare plants or plant communities; or coastal geologic features. Significance is further determined by analysis of the cultural value or the historic or present-day human use made of the natural resources, which may enhance the standing of a potential ONCA. Although people may live in an area to be considered for designation as an ONCA, it must have a preponderance of significant natural resources to satisfy this criterion.

Criterion 2: The resources are at risk.

Areas determined to contain significant resources are evaluated next with regard to whether the resources are at risk. Risk is determined by the degree to which a potential ONCA's natural and related cultural resources have been subject to, or are likely to be subject to,

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primary, secondary, and cumulative negative impacts associated with existing and new development or people's activities. Such impacts place ecosystem viability and, consequently, people's quality of life, at risk.

Criterion 3: Additional management measures are needed to preserve or improve the significant resources, or sustain their use.

Finally, an area with significant resources that are found to be at risk must require additional management measures beyond those currently available to maintain or improve those resources and the viability of the ecological complex within which they function.

Guidelines for Applying the Criteria

The following provides guidance for applying the criteria to an area under consideration as an ONCA.

Criterion 1: Significance of Natural Resources

Although ONCAs may contain some development or impairments to ecological systems, they must have a preponderance of significant natural resources. Ecological communities must be "natural," defined here as ecological communities wherein the physical conformation of the land or water body and the biological composition of the resident communities are not significantly different from the character of the land or water body and the community that would have been found prior to modern human influence. Although no ecological communities in the Sound's coastal area escape human influence, those that retain the predominantly native biological composition of a community are considered "natural." By contrast, a "cultural" ecological community, such as a mowed lawn with trees, contains fewer species—a significant proportion of which are exotic—than would occur in a natural community.

Ecological and geologic significance of the natural resources may be recognized in existing regulatory and public planning arenas, as illustrated by regulations to protect or conserve the resources, inclusion in planning documents, or previous designations.

Ecological significance is indicated when the area lies within or contains:

- New York State Significant Coastal Fish and Wildlife Habitat
- United States Fish and Wildlife Service Significant Coastal Habitat
- National Wildlife Refuge or a state or county wildlife sanctuary
- state, county, town, or private nature preserve
- natural ecological communities that provide sites for education in environmental or natural sciences
- New York Natural Heritage Program species or plant community element occurrence
- habitat for endangered or threatened species or species of special concern designated by the state or federal governments
- freshwater or tidal wetlands that provide important fish, wildlife, and water quality benefits
- site identified for acquisition or other priority protection by the New York State Open Space Conservation Plan or a county or local open space plan because of the significance of the ecological resources
- site identified as important or significant for its ecological resources in an approved or draft Local Waterfront Revitalization Program

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Geologic significance is indicated when the area contains or lies within:

- a component of the Coastal Barrier Resources System
- a Coastal Erosion Hazard Area identified by New York State
- an area identified as important or significant for its geological resources, natural protective features, or coastal erosion and hazard potential in an approved or draft Local Waterfront Revitalization Program or comprehensive waterfront plan
- an area recommended for acquisition or other priority protection in the New York State Open Space Conservation Plan or a county or local open space plan because of the significance of its geological resources, natural protective features, or coastal erosion and hazard potential
- freshwater or tidal wetlands that provide important erosion, sedimentation, and pollution control benefits
- a geologic formation critical to shoreline/beach nourishment or protection from tide, wind, and wave energy
- a barrier spit
- a geologic formation of scientific or educational significance
- a geologic formation unique to the region or the state

An area found to possess significant natural resources also may possess **significant cultural resources** related to the significant natural resources. Determinants of cultural or human use significance include:

- The area's natural resources provide **economic benefits**. The coastal features, natural elements and/or community character of the area provide direct and indirect economic benefits to the region through recreation, tourism, property values, commercial fishing and shellfishing, related commercial enterprises, and user fees.

- The area provides **significant active or passive outdoor recreational opportunities**.

- The area contains **significant archaeological or historic sites or traditional groups or societies** that are integrated with, derived from, or dependent on the area's natural resources.

- The area provides **significant scenic or aesthetic benefits** or a **sense of place**; that is, the natural and/or cultural characteristics of the area form a cohesive framework from which people derive a specific sense of a uniquely identifiable location in the region.

Criterion 2: Resources at risk

An ONCA's natural and related cultural resources are determined to be at risk from identifiable primary, secondary, and cumulative impacts from government actions and people's activities:

- where conflicts in use or in resource protection objectives exist, preventing adequate management of the area and its resources
- where pressure on a resource from human use or exploitation threatens the very resource sought
- where the potential of significant cumulative impacts to the ecosystem is great
- when past or imminent actions are likely to change the characteristics of development patterns or the intensity of use within the area

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The following definitions were adapted from The SEQR Handbook.

A **primary impact** is one which occurs at the same place and time as a particular action/activity and which likely would occur as a direct result of the action/activity. Example: Dredging for creation of a marina may remove productive shellfish beds.

A **secondary impact** is one which is foreseeable, but occurs at a later time or at a greater distance and likely would be indirectly caused by the action/activity. Example: Heavy use of fertilizers on a golf course may increase the nutrient load of runoff entering ponds, resulting in rampant algal/plant growth, consequent oxygen depletion when plant matter decomposes, and then fish kills.

Cumulative impacts are impacts on the environment that result from the incremental or increased impact of an action or activity when added to other past, present, and future actions or activities. Cumulative impacts can result from a single action or a number of individually minor but collectively significant actions taking place over a period of time. Example: The clearing of an acre of forest adjacent to a stream corridor for a single family dwelling may have relatively insignificant, short-term, negative impacts on the stream's fish resources, but similar activities, repeated along the length of the stream corridor, may remove shade, produce significant sedimentation, and increase nutrient loads, ultimately altering stream conditions to the point where sensitive species, such as trout, no longer can be supported.

The following is a partial list of activities which may have adverse primary, secondary, or cumulative impacts on the natural and related cultural resources of the ONCA. These, and similar activities, should be evaluated to determine the degree to which the existing or potential extent of the activity within the ONCA would place resources at risk:

- materials discharge into surface water or groundwater
- water intakes: installation and operation
- wetland alterations
- topographic or hydrologic alterations
- alterations to natural ecological communities
- alteration to or demolition of historic structure or historic landscape

The following are examples of specific activities that may include or engender the above:

- residential, commercial, industrial, or office construction
- road construction
- energy transmission, telephone, or cable line construction
- expansion and intensification of existing uses
- off-road recreational vehicle use
- dredging

The following chart provides examples of primary impacts, and the secondary and cumulative impacts that possibly, but not necessarily, follow.

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Primary Impact	Secondary Impact	Cumulative Impact
Vegetation loss	Soil erosion	Shoreline erosion
Vegetative loss	Sedimentation in wetland	Loss of regional fishery
Piping plover chick death by off-road vehicle	Population reduction, gene pool reduction	Extinction of species
Elevation of nitrogen levels in surface water from point discharge	Algal bloom, localized oxygen depletion via decomposition	Regional hypoxia, loss of biological diversity
Loss of forest; replacement by single-family dwelling	Introduction of alien plants and predators (pets)	Local extinctions of native species
Floating plastic waste in bay from vessel waste discharge	Ingestion by or entrainment of sea turtles	Extinction of species
Loss of freshwater wetland from sedimentation	Loss of amphibian breeding area; loss of source for immigration stock	Island-wide extirpation
Loss of native vegetation and soil permeability from road construction	Nonpoint source pollution of surface waters	Beach closures
Pollutants in runoff from marinas, boat yards, and shoreline development enter surface waters	Contaminated shellfish bed	Loss of local shellfish industry

Criterion 3: Additional Management Measures Needed

Management measures are needed to protect and restore estuarine and terrestrial ecosystem functions for their intrinsic values, as well as for the benefits derived by people who live in and visit them. When the significant resources of a candidate ONCA are at risk from identifiable primary, secondary, and cumulative impacts, the final level of evaluation determines whether the identified impacts can or are being addressed through existing management measures. If adequate steps are being taken or are imminent to protect and restore the natural resources within a candidate ONCA, this criterion is not met.

Additional management measures are required, for example:

- to augment or refine regulatory and non-regulatory programs or approaches that have not provided or may not provide sufficient protection to all the area's resources
- to provide opportunities for natural resources planning among multiple jurisdictions
- to resolve conflicts in use or in resource protection objectives for adequate or timely management of the area and its resources
- to prevent cumulative environmental impacts

Based on the natural and related cultural resources in an area, and the factors placing those resources at risk, any of the following additional measures, and combinations thereof, may be required for effective long-term protection:

- regulation
- acquisition
- other land protection strategies (such as easements, landowner agreements)
- remediation
- research and planning
- increased intergovernmental coordination

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- public education
- incentives for local governments and voluntary action

Management Objectives for Outstanding Natural Coastal Areas

The objectives of the Long Island Sound Coastal Management Program for ONCAs are listed below. The objectives are related to one another, because the resources, as well as their impairments, are related. The achievement of a given objective may depend on the achievement of another. An overall strategy must be developed for each ONCA that shows recognition of these relationships.

- Prevent fragmentation of natural ecological communities.
- Curtail nutrient and contaminant loads to Long Island Sound and its tributaries.
- Manage development in the ONCA watersheds to result in cleaner surface waters, protection of estuarine life, maintenance of commercial shellfishing, and restoration of shellfish harvesting where natural ecosystem processes may permit.
- Maintain the benefits of natural shoreline functions.
- Protect and restore freshwater and tidal wetlands and their natural functions.
- Protect and, where appropriate, expand populations of New York Natural Heritage elements (endangered, threatened, and rare species and rare natural communities).
- Maintain sustainable populations of fish, shellfish, and wildlife species that depend on the resources of an ONCA for critical stages in their life cycles.
- Protect, and where possible, expand native plant communities.
- Ensure that recreational activities in the ONCA will be compatible with the protection of ecological communities; endangered, threatened, and rare species; species of special concern; economically important species; and other intrinsic ecosystem elements.
- Prevent impairments to coastal access and develop new access opportunities that are compatible with protection of natural resources.
- Request the public to drive the process of protecting the resources of the ONCA.

Long Island Sound's Outstanding Natural Coastal Areas

Three locations, shown on map 23.0, have been identified as Outstanding Natural Coastal Areas following an evaluation of their resource values, the degree of risk, and the need for additional management measures. Among the many significant natural areas of the Sound, these ONCAs—Oyster Bay-Cold Spring Harbor, Crab Meadow-Fresh Pond, and Stony Brook-Setauket—will be the focal points for a new and comprehensive management program. Each area is described and analyzed below.

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Oyster Bay-Cold Spring Harbor Outstanding Natural Coastal Area

The Oyster Bay-Cold Spring Harbor Outstanding Natural Coastal Area (map 24.0) extends from Peacock Point south along Peacock Lane in Lattingtown to the state coastal area boundary, then east along the coastal boundary to the west side of Cold Spring Harbor, where it follows the extended coastal boundary proposed by the Town of Huntington. It then follows the highest elevation contour along the east side of the harbor north into the Village of Lloyd Harbor and ends at the northern boundary of Lloyd Harbor village park. The ONCA is in both the Town of Oyster Bay and the Town of Huntington and both Nassau and Suffolk counties. It includes all of the villages of Cove Neck and Centre Island and parts of the villages of Lattingtown, Matinecock, Mill Neck, Upper Brookville, Muttontown, Oyster Bay Cove, Laurel Hollow, and Lloyd Harbor. It includes all the waters of the Oyster Bay and Cold Spring Harbor complex.

Because they are densely developed and lack the requisite natural features, neither the Village of Bayville nor the hamlet of Oyster Bay is included. Nonetheless, human activities in these areas play a significant role in the overall ONCA ecosystem. Many human activities, such as shellfishing, in turn, are affected by the ability of the ecosystem to perform its natural functions.

Proposed extensions of the state coastal area boundary are shown on map 26.1. The boundary is proposed to be extended beyond the existing coastal boundary to include the wetlands and headwaters of streams discharging to Oyster Bay Harbor and Cold Spring Harbor and large remaining tracts of native oak-tulip tree forest and chestnut oak forest. These forest communities are characteristic of New York's coastal lowlands, but development has greatly diminished their extent and they are continuing to disappear.

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23.0 Proposed Outstanding Natural Coastal Areas

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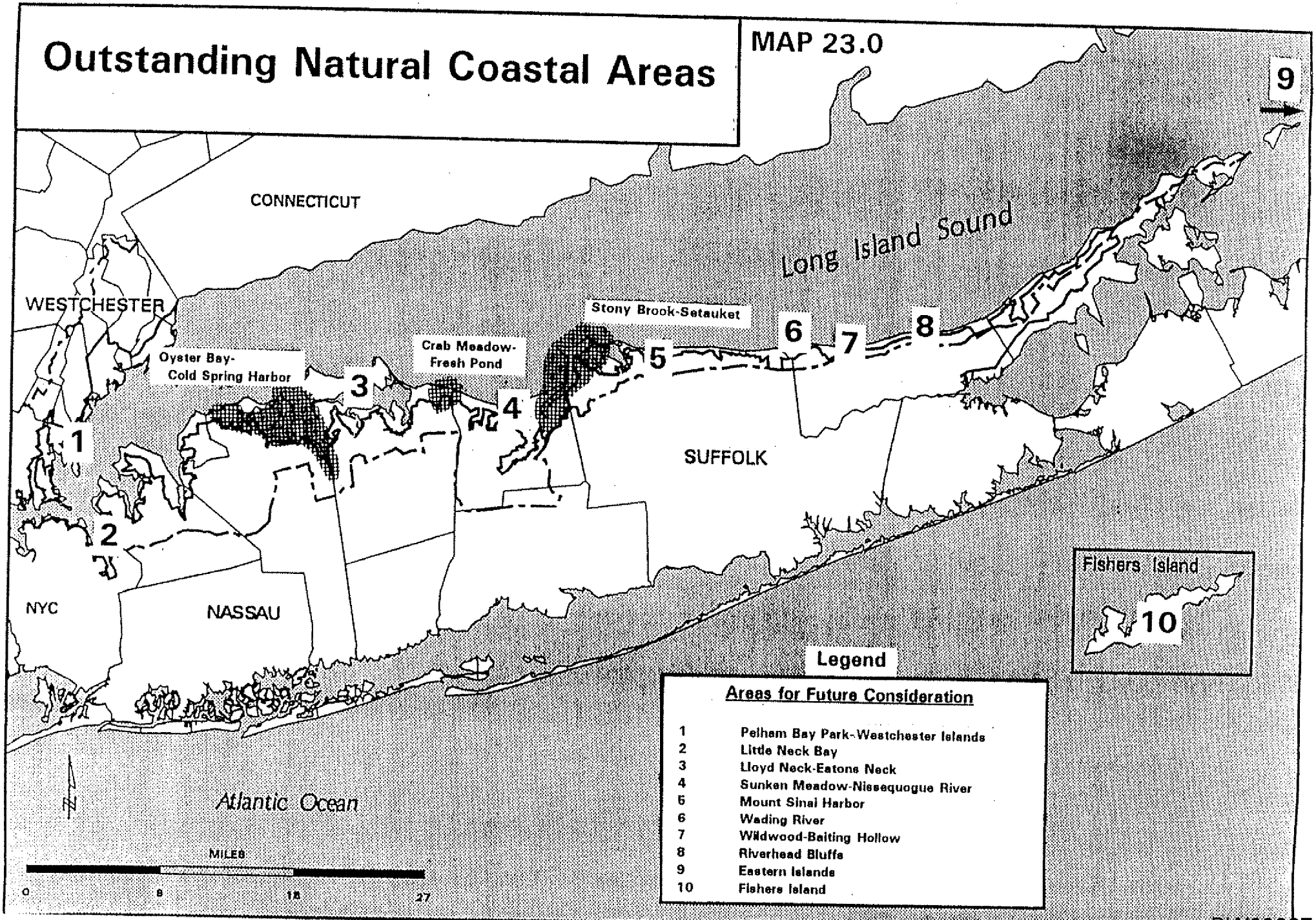
Outstanding Natural Coastal Areas

MAP 23.0



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Application of the Criteria to the Oyster Bay-Cold Spring Harbor ONCA

Criterion 1: Significance of Natural Resources

Although it is located mostly in densely populated Nassau County, the Oyster Bay-Cold Spring Harbor ONCA has a relatively high proportion of land in its natural or nearly natural state. The uplands and surface waters sustain a high diversity and large populations of wildlife, fish, and other freshwater and estuarine organisms.

Significance of Ecological and Geological Resources

The ONCA contains a variety of geologic formations that support diverse natural communities: glacial moraines support dry and mesic native plant communities, including chestnut oak forests and oak-tulip tree forests; ravines yield red maple-hardwood swamps, springs and creeks; headlands with barrier spits yield maritime shrubland and maritime sandy beaches; bluffs support mixed hardwoods; and bays contain marine subtidal, intertidal, and salt marsh communities. Freshwater impoundments contain emergent marshes and ponds. For additional information, refer to the description of the Harbors Complex, chapter 3.

The Oyster Bay-Cold Spring Harbor ONCA is rich with freshwater wetlands and streams that run north, mix with tidal waters, and finally discharge to the harbors. These systems originate from areas where groundwater reaches the surface, yet they also are fed by precipitation, overland runoff, and direct road drainage. Several areas of the streams are impounded, forming ponds. The two largest freshwater wetlands are the Beaver Brook-Shu Swamp system (connected to Mill Neck Creek tidal wetlands) and the Cold Spring Harbor headwaters. Tidal wetlands lie throughout the ONCA, with the largest intertidal marsh areas at Mill Neck Creek, Frost Creek, Oak Neck Creek, and Centre Island and smaller tidal systems near Goose Point and at the head of Cold Spring Harbor. The Mill Neck Creek wetland system is one of the north shore's largest undeveloped wetland ecosystems.

The Oyster Bay National Wildlife Refuge (OBNWR) is the centerpiece of this ONCA. The OBNWR includes tidal wetlands and waters of Mill Neck Creek, most of Oyster Bay Harbor and Cold Spring Harbor west of the Suffolk County line, portions of Frost Creek wetlands, and the inland Mill Pond, south of lower Oyster Bay Harbor. The refuge supports the most important waterfowl wintering area on the north shore of Long Island, particularly for scaup and black duck.

Other federal, state, county, town, and village preserves and recreational parks lie within the Oyster Bay-Cold Spring Harbor ONCA, its extended area, and its watershed. Some of the parks, though not officially designated as preserves, protect native plant communities from development, thereby providing wildlife habitat. Sagamore Hill National Historic Site, in Cove Neck, is contiguous with the OBNWR. Planting Fields State Park and Arboretum in Upper Brookville contains native forests, in addition to its gardens, former Coe estate buildings, and greenhouses. The state also holds land adjacent to the pond system at the head of Cold Spring Harbor. Bailey Arboretum County Park lies within the ONCA. Muttontown Preserve and Stillwell Woods County Park are in the upper watershed of the ONCA. The Tiffany Brook Preserve lies within the ONCA's extended boundary area.

The Nature Conservancy maintains preserves in the ONCA and its extended area and watershed. These include: Uplands Farm, Franklin's Pond, and St. John's Pond Preserve in Cold Spring Harbor; Davenport and Fox Hollow Preserve in Laurel Hollow; Cushman Preserve in Oyster Bay Cove; and the Iselin and Rose Preserves near Planting Fields. The

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privately owned Shu Swamp Nature Preserve in Mill Neck provides nature trails and a setting for interpretive walks. Cold Spring Harbor Fish Hatchery, a private nonprofit environmental education facility, lies just south of Route 25A at the head of Cold Spring Harbor.

Two New York Natural Heritage Program (NYNHP) elements have been identified within the ONCA boundary in recent years: osprey breeding at Mill Neck Creek wetlands with a "housekeeping" nest at Lloyd Harbor and sweet bay in Mill Neck in a freshwater wetland area. Additional NYNHP elements have been located in recent years in the proximity of areas proposed for an extended ONCA boundary: downy lettuce, green milkweed, Atlantic white cedar, whorled mountain mint, Mitchell sedge, and woods-rush. Historic records for white milkweed, yellow giant-hyssop, heart sorrel, and a rare sedge indicate their occurrences within the ONCA in the early part of this century. Collins sedge was last observed in one of these extended areas in 1935. Such historic records guide research regarding habitat needs and indicate the need for further field investigations regarding possible present-day occurrences.

There are approximately 14 barrier spits in this ONCA, including four that are within protected units of the Coastal Barrier Resource System. These and other geologic formations in the ONCA, such as shoals, dunes, and bluffs, are natural protective features that protect the bay environment and coastal properties from flooding and erosion hazards.

The following designations, programs, and plans that are applicable within this ONCA indicate the degree of public recognition of the significance of its natural resources:

USFWS Significant Coastal Habitat: The ONCA contains a portion of the "Three Harbors Area" Significant Coastal Habitat identified by the U.S. Fish and Wildlife Service (USFWS) in 1991. Appendix 6 contains the full Three Harbors Area site description and map. Appendix 6 provides information from the Northeast Coastal Areas Study regarding the selection of the Significant Coastal Habitats.

Significant Coastal Fish and Wildlife Habitat: The ONCA contains three Significant Coastal Fish and Wildlife Habitats, designated under Executive Law, Article 42: Mill Neck Creek Wetlands, Oyster Bay Harbor, and Cold Spring Harbor. Chapter 3 contains details of these habitat units.

New York Open Space Conservation Plan: "Conserving Open Space in New York State," produced pursuant to State Land Acquisition, ECL, Article 49, Title 2. In addition to the sites listed in the plan, the Region 1 Land Acquisition Advisory Committee recommended four sites within this ONCA, eight others within the proposed extended ONCA, and 15 more in its watershed and the Oyster Bay SGPA for public acquisition or protection. At least three parcels already have been acquired.

Special Groundwater Protection Areas: Part of the Oyster Bay Special Groundwater Protection Area (SGPA), designated pursuant to ECL, Article 55, lies within the ONCA and its proposed extended areas. Designation as an SGPA "warrant[s] urgent management attention" to protect the land as a source of uncontaminated recharge to the deep flow aquifer (LIRPB, 1986).

New York State regulated tidal wetlands (Tidal Wetlands Act, ECL, Article 25): Refer to chapter 3 for a detailed description of wetland resources.

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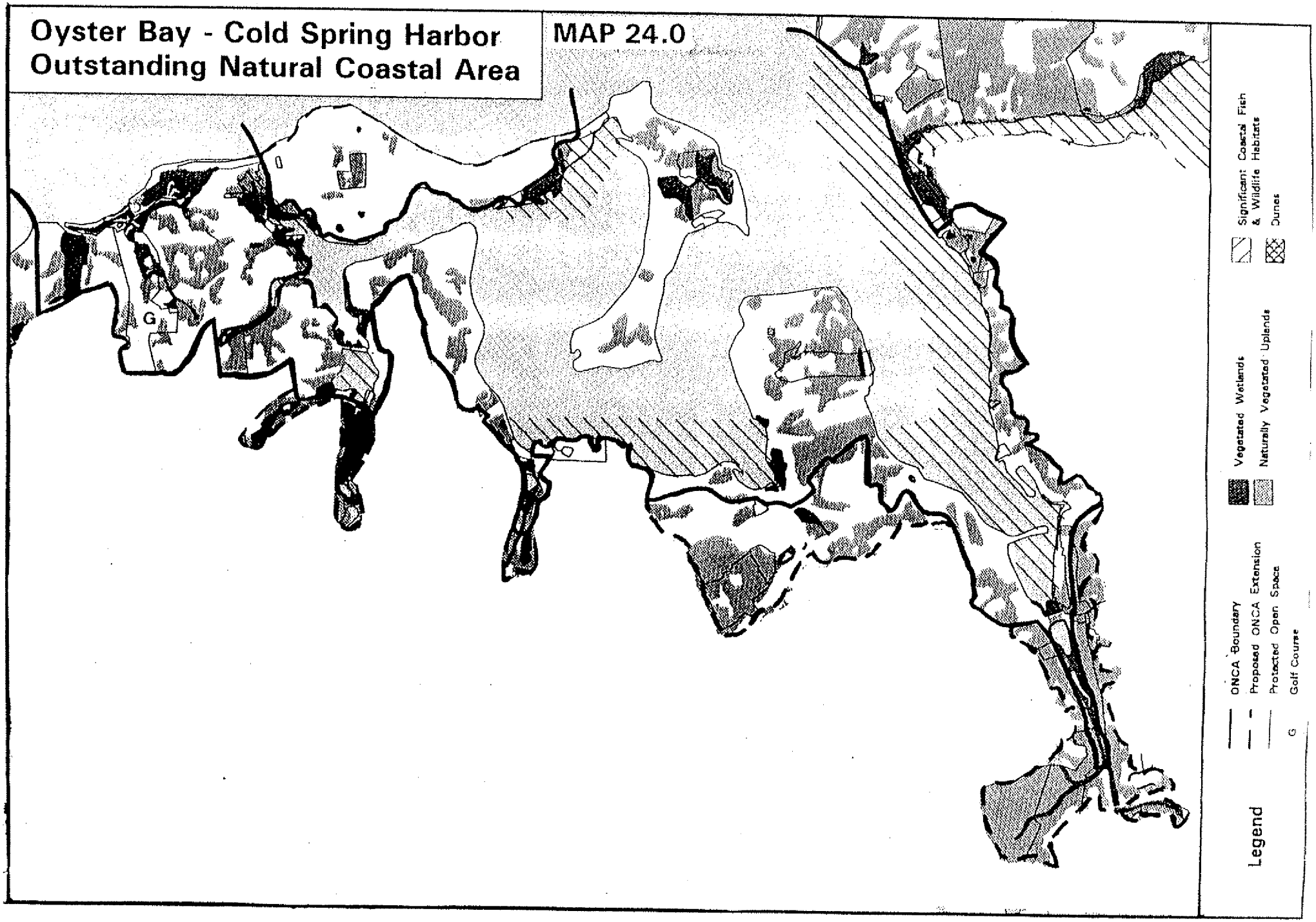
Oyster Bay - Cold Spring Harbor Outstanding Natural Coastal Area

MAP 24.0



New York State regulated freshwater wetlands (Freshwater Wetlands Act, ECL, Article 24): Refer to chapter 3 for a detailed description of wetland resources.

Coastal Barrier Resource System protected units (federal Coastal Barrier Resources Act): Refer to chapter 3 for a detailed description of coastal barrier resources.

Local Waterfront Revitalization Programs: A draft joint Local Waterfront Revitalization Program (LWRP) has been prepared for the Town of Huntington and the villages of Asharoken, Huntington Bay, Lloyd Harbor, and Northport. The Town of Oyster Bay is preparing a harbor management plan and an LWRP.

Significance of Cultural Resources

Oyster Bay and Cold Spring Harbor are widely known for the commercial fisheries they sustain. Under a lease with the town, the F.M. Flower and Sons Oyster Co. harvests 90 percent of New York's oyster crop from these waters. According to the NYS DEC Bureau of Shellfisheries, the overall oyster harvest in the two water bodies was 70,255 bushels in 1991 and 74,374 bushels in 1992. The hard clam harvest was 27,932 bushels in 1991 and 29,713 bushels in 1992. The ONCA is a major New York port area for lobster boats and clam boats.

Oyster Bay and Cold Spring Harbor are recognized by the public as outstanding areas for water-related recreational activities, such as fishing, boating, sailing, shellfishing, and bird watching. The Town of Oyster Bay operates Theodore Roosevelt Memorial Park and Beekman Beach at the southern end of Oyster Bay Harbor. The Town of Huntington offers Cold Spring Harbor Marine Park along Route 25A in Cold Spring Harbor. Two town beaches lie along the neck to Centre Island. Village parks and beaches are situated throughout the ONCA. A portion of the Nassau-Suffolk Greenbelt Trail extends north from Woodbury into the ONCA, through Stillwell Woods County Park, to the west side of Franklin Pond Preserve, and continuing north to the west side of Cold Spring Harbor.

General public access to the coast is limited within the ONCA, primarily by residency requirements of village and town beaches and parks. Although the vast Oyster Bay National Wildlife Refuge is the focal point of water-related activities, and theoretically is open to all, there is no physical access to the refuge via federally owned property. The OBNWR management is interested in promoting non-motorized small boat use rather than power boats and live-aboard vessels, but parking and launching sites are not available to nonresidents of the town.

The primary land use in the ONCA, its extended area, and its watershed is low-density residential, closely followed by open space. If the OBNWR property is included in area calculations, the predominant acreage in the ONCA is public open space. Citizens have made recent concerted efforts to identify additional areas for public ownership. Given the extensive existing public holdings in this area, this activity indicates the public's concern for the natural environment in the Oyster Bay-Cold Spring Harbor ONCA and points to a desire to maintain the area's essential character.

The countryside of rolling, laurel- and oak-covered hills, and open fields descending to bays, coves, and salt marshes, with expansive water views and distant land horizons is maintained by the presence of large estates found throughout the ONCA, its extended area, and its watershed. The historic sites of Cold Spring Harbor are appreciated by residents and visitors alike. Views from the barrier spits, beaches, and bluffs are dramatic and give a feeling of

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26.1 Oyster Bay-Cold Spring Harbor Outstanding Natural Coastal Area with Watershed Detail

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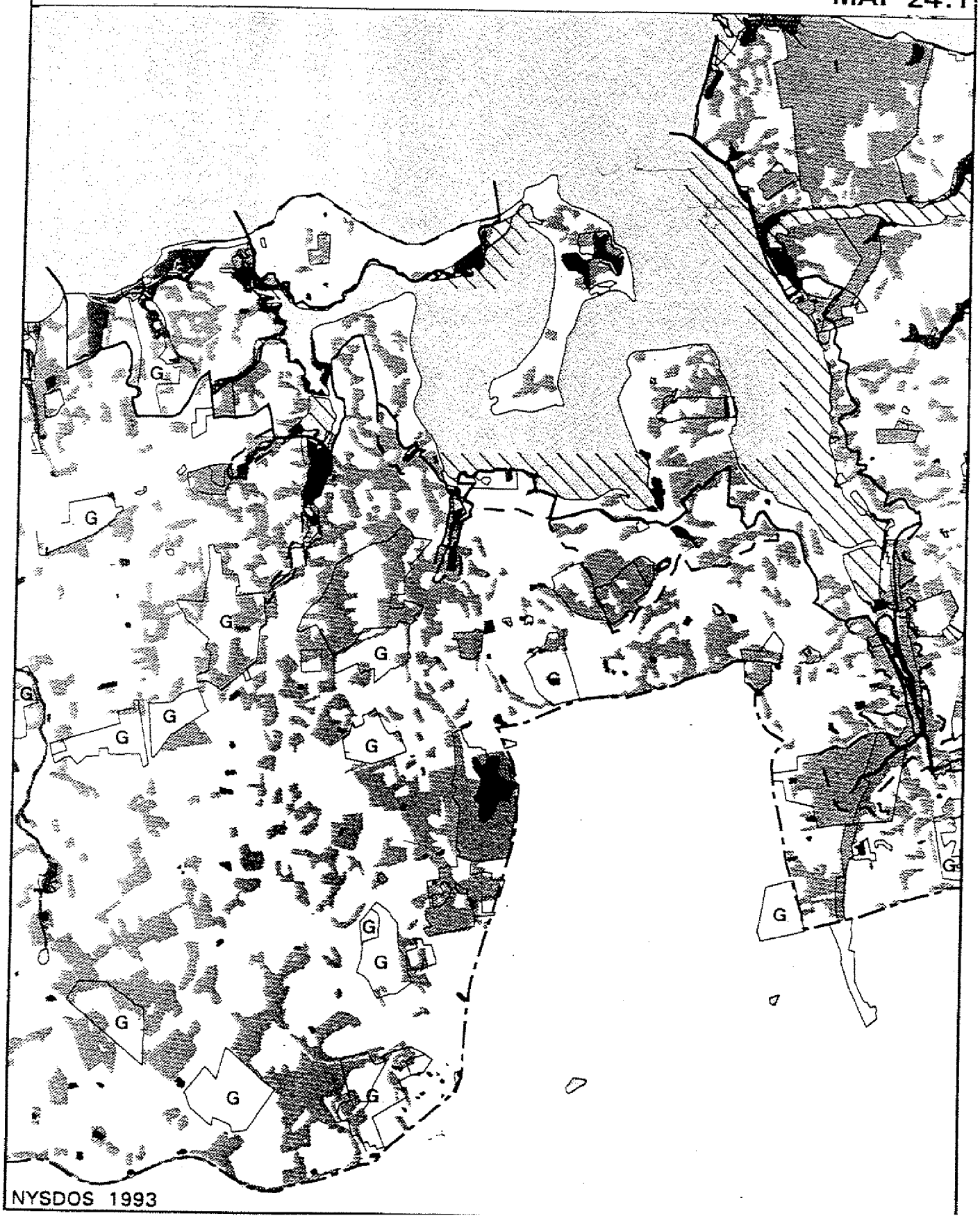
Oyster Bay - Cold Spring Harbor Outstanding Natural Coastal Area with Watershed Detail

ONCA Boundary
Proposed ONCA Extension
Protected Open Space
G Golf Course
Vegetated Wetlands
Naturally Vegetated Uplands
Watershed Boundary
Significant Coastal Fish & Wildlife Habitats
Dunes

MAP 24.1



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isolation and wildness.

Four areas within the ONCA are described in New York State Museum Archaeological Site Files. These areas are on Centre Island, Oak Neck, and near Frost Creek. Virtually all of the remaining area in the ONCA possesses "multiple site sensitivity," because of the presence of archaeological and historic resources. These ancient sites are further testimony to the long-standing connection between the natural resources of this ONCA and the area's attractiveness for human habitation.

Criterion 2: Resources at Risk

Historic and current human use has altered the landscape, adversely affecting ecosystem functions. Past and present industrial activities, existing development—which is dense in Bayville and the hamlet of Oyster Bay—and recreational activities in the surface waters and in the watershed have resulted in primary, secondary, and cumulative impacts on the ONCA's natural ecological communities, and hence on Long Island Sound's ecosystem and people's quality of life.

Water quality in this ONCA is threatened by degraded conditions in the tributaries to the embayments, heavy boat traffic, vessel discharges, point source discharges of pollutants, and nonpoint source pollution. Although most of the OBNWR's waters and the remainder of Oyster Bay and Cold Spring Harbor meet the standards for their assigned classifications, some do not meet their use standards and are closed to shellfishing seasonally or year-round. Beaches have been closed in some areas when coliform bacteria counts are high.

In the Oak Neck Creek portion of the Mill Neck Creek wetlands and in two areas of the lower Oyster Bay Harbor, high concentrations of lead, copper, nickel, silver, and zinc were found in samples taken by the USFWS in 1990. The possible bioaccumulation of heavy metals in shellfish and other invertebrates, vertebrates, algae, and higher plants indicates the need to continue monitoring and to identify and control sources. Past and present industrial and commercial activities in the vicinities of the sampling sites may be the sources of the contaminants (USFWS, 1991). An area along the west shore of Oak Neck Creek (a tributary to Mill Neck Creek) is reported to have been filled with construction debris. A Nassau County water supply well in Bayville near Mill Neck Creek had high elevations (100–1000 μg/l) of total volatile organic compounds in 1986 (Nassau County, 1987), but two others nearby had none detected at 10 μg/l or above. The source(s) of contaminants reaching the sediments of Mill Neck Creek and the groundwater supply may be very localized.

The Commander Oil facility and the former Jakobson Shipyard threaten the resources of the ONCA because of past and potential oil spills and other contamination originating from these installations. The Town of Oyster Bay recently gave summonses to Commander Oil for environmental violations during inspections conducted by town planning and development inspectors. The state is developing the terms of a consent order for the clean-up of the shipyard.

A municipal wastewater treatment plant is situated on the shoreline of lower Oyster Bay Harbor, directly adjacent to the public beach. The effluent is discharged into the harbor and contributes to nutrient loadings in the harbor complex. The Cold Spring Harbor National Laboratory discharges to the south end of Cold Spring Harbor, with the same effect.

Two private clubs lie in the ONCA and several more in its watershed. These clubs encompass over 1,200 acres, with significant acreage devoted to golf courses. Several golf

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courses contain freshwater wetlands contiguous to tidal wetlands. One of the golf clubs has a large golf course, swimming beach, and forested areas adjacent to the tidal wetlands of Frost Creek. The area constitutes partially natural open space in the community. The golf course has been extended over the marsh islands, using fill and shore reinforcements, with bridges connecting the islands and the club beach on Long Island Sound. Pedestrians and maintenance operations may deter use by wildlife other than Canada geese, which often are attracted to golf courses by the particular juxtaposition of forage grasses and surface water.

Inappropriate land use in and adjacent to freshwater and tidal wetlands contributes to the deterioration of wetland benefits, such as wildlife habitat, erosion and sedimentation control, stormwater filtration, and aesthetic amenities. Shoreline fortification structures, exotic landscaping, and drainage facilities are common existing modifications that remove, alter, or introduce pollutants to wetlands in this ONCA. Public entities also contribute to wetland impairments. At Mill Pond, for example, street drains empty into the pond, causing siltation and potential contamination, and a town-owned maintenance yard is situated in the wetland adjacent area, on or near OBNWR property.

In the Oyster Bay-Cold Spring Harbor ONCA watershed, large remaining tracts of forested land present opportunities for preservation, but also contribute to a false sense of unlimited forest resources. Relative to many other north shore areas, this ONCA retains a "countryside" appeal, which is attributable to the large estate holdings. Yet, the watershed of Oyster Bay-Cold Spring has more land potentially available for residential development than any sub-watershed of the Sound in Nassau and Suffolk counties. Estate subdivisions proceed, as well as individual lot developments. Much of the "available" land is steeply sloping, with highly erodible soils, or includes or is adjacent to wetlands.

Fragmentation of natural ecological communities occurs through development, construction of long docks, hardening of the shoreline, and private and institutional landscaping activities. Once-forested corridors around the tributaries to the harbors have been modified to create large estate lawns, yet maintain the potential for reestablishment through cooperative restoration agreements. Fragmentation of these corridors not only reduces wildlife habitat, but also removes protective buffer zones from wetlands and surface waters.

People inhabit and play in nearly all the different geologic formations in this ONCA. Public and private erosion control projects, requiring significant expenditures, have altered coastal processes. Within the Oyster Bay-Cold Spring Harbor ONCA, extensive areas of shoreline already are hardened, most notably in Bayville, West Shore Road, lower Oyster Bay Harbor, and Cold Spring Harbor. Bayville contains 71 percent of all structures within the Coastal Erosion Hazard Area boundary from Queens to Miller Place.

Erosion along Centre Island Road, caused, in part, by sea walls to the west in Bayville, is threatening a loss of access to Centre Island. Although erosion rates have not been measured in the harbors, the combination and intensity of human uses places safety and financial investment at risk in some of these waterfront areas. For example, West Shore Road to Bayville suffered severe damage in 1992–1993. State Route 25A near Cold Spring Harbor may need relocation because of flooding and erosion damage. Emergency repairs not only are expensive, but often preclude attention to protective state and federal environmental regulations, requirements of the OBNWR, and local environmental laws. Consensus among multiple jurisdictions is needed for long-term, erosion-control strategies.

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There is considerable debate about whether the OBNWR is overused. The 1968 transfer of the refuge property from the town to the federal government contains unusual provisions that create unique management problems for the U.S. Fish and Wildlife Service. The deed is not specific regarding moorings, swimming, boating, and commercial activities other than shellfishing, but a Memorandum of Understanding allows all boating and general recreational activities to continue. When the property was deeded to the U.S. Fish and Wildlife Service, the mineral rights, limited mooring facilities, and aquaculture privileges of the bay were retained by the Town of Oyster Bay. Both the U.S. Fish and Wildlife Service and the town are seeking clarification on the recreational uses allowed in the bay. It is clear the OBNWR is a regional and statewide resource of importance that is in demand for competing uses.

Because of the above uncertainties regarding uses of the OBNWR, there are unresolved legal matters between the U.S. Fish and Wildlife Service and certain landowners around the refuge who have built docks that extend into the federal waters. Regardless of the legal foundations, there are a large number of docks over 100 feet long throughout the ONCA which impair lateral access along beaches and near-shore navigability.

General public access to ponds for freshwater fishing is limited by village parking restrictions. The refuge's Mill Pond offers a popular early season trout fishery, but overuse of this one resource has exacerbated shoreline compaction and erosion. Hand feeding encourages Canada geese to remain at the pond, which, in turn, contributes to water quality problems in the pond and in lower Oyster Bay Harbor.

Although the town beach in the hamlet of Oyster Bay affords physical and visual access to the water, residents are concerned about runoff from the beach parking lots entering the harbor. Bathing is not permitted because the town has not provided required sanitary and safety facilities. The municipal wastewater treatment plant, which is situated west of the public beach, and discharges directly into the harbor, presents aesthetic problems for beach users. The plant recently was upgraded to provide chlorination for pathogen removal and to increase its capacity to handle groundwater infiltration.

Population and housing data for the ONCA watershed suggest a stable or declining population; however, the number of housing units is expected to rise. Based on available land and existing zoning, if all land in the watershed were to be developed the total build-out population in the watershed is estimated to be about 50,550 people housed in approximately 17,900 units. If such an increase were to occur, over 5,000 additional residents would require services and demand access to and use of the waterfront.

Secondary environmental impacts of development (such as nonpoint source pollution, spills of toxic and hazardous materials, solid waste, introductions of exotic plants and domestic pets, and increased traffic) and cumulative impacts (such as effects of incremental losses of wetland, shoreline, and forest resources from illegal filling, development of wetland adjacent areas, road and yard widening, erosion control structures, and cultural "grooming" of the landscape) may reasonably be expected to increase, unless a plan for restoring and maintaining ecosystem vitality is developed and followed.

Criterion 3: Additional Management Measures Needed

Within the coastal area and the proposed extended boundaries for this ONCA are many different governmental jurisdictions and overlaps in regulatory authority. The incorporated villages of Lattingtown, Bayville, Mill Neck, Matinecock, Upper Brookville, Oyster Bay Cove, Cove Neck, Laurel Hollow, and Lloyd Harbor; the towns of Oyster Bay and

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Huntington; Nassau County and Suffolk County; New York State; and lands and underwater lands of the U.S. Fish and Wildlife Service all come together in and around the water bodies of Oyster Bay and Cold Spring Harbor. Agreement and cooperation among all levels of government, hand-in-hand with the citizens they represent, is imperative for real protection of this outstanding coastline. Research, long-term monitoring, education, open discussion and long-term planning can provide the feedback necessary for such cooperative ventures to be sustained.

The Town of Oyster Bay LWRP and the joint LWRP for the Town of Huntington and the villages of Asharoken, Huntington Bay, and Northport need to be completed. The Village of Lloyd Harbor will have an approved LWRP in 1995. These LWRPs should incorporate the management measures needed to protect the resources of the ONCA, particularly harbor management plans, which are needed to achieve coordinated and comprehensive regulation and management of all uses of surface waters and underwater lands. Furthermore, the Oyster Bay Harbor component of the Town of Oyster Bay's harbor management plan and the Cold Spring Harbor portion of the Huntington harbor management plan need to complement each other. With the cooperation of the U.S. Fish and Wildlife Service, the process of developing such plans would help clarify many unresolved issues related to jurisdictional conflict and appropriate uses and would result in better protection and management of the area's sensitive natural resources. Clear courses of action and lines of authority would be ensured in responses to oil spills.

Through state management, all levels of government, as well as citizens, could cooperate within a unified framework to protect the resources of the Oyster Bay-Cold Spring Harbor ONCA. Management of this ONCA must recognize that people and their activities are an integral part of this natural area; however, additional guidance, restrictions, and enforcement measures are needed to reduce deleterious human impacts and restore natural communities and processes.

Specific Actions Needed

Develop a comprehensive management plan for the Oyster Bay-Cold Spring Harbor Outstanding Natural Coastal Area. Extend the coastal boundary to include areas shown on map.

The following specific planning and management actions are needed:

SPDES: Reassess SPDES permits; set new discharge limits as needed. If necessary, create a SPDES program specific to the ONCA with strict enforcement.

Freshwater Wetlands Maps: Amend state regulatory maps for Nassau County freshwater wetlands to include appropriate wetlands that are less than 12.4 acres in size.

Land Use Regulation: Evaluate large private open space and estate holdings for their best use; amend local zoning regulations, if necessary.

Erosion Monitoring: Monitor shoreline erosion rates in the harbors; adjust bluff setback requirements accordingly.

The following site-specific actions should be included in the management plan, but may be undertaken while the plan is being prepared:

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Mill Neck Creek (1 acre): If not already public trust land, acquire for addition to complex of county and federal land along tidal wetlands. In addition, improve water quality by establishing a permanent forested corridor from Planting Fields Arboretum north to the west tributary to curtail stormwater runoff to creek and tributaries.

Planting Fields Arboretum: Establish an indigenous plant program with research, demonstration gardens, and public education in the uses of indigenous plants.

West Harbor: Protect water quality and significant commercial oyster fishery.

National Wildlife Refuge: Resolve discrepancies between deed restrictions on bottom land transferred to National Wildlife Refuge and codes and rules of the refuge system, especially regarding boat moorings and bottom disturbance.

Beaver Lake: Provide fishing access (parking).

Shu Swamp: Protect rare species and eradicate invasive exotic plants; acquire linking properties along stream corridor.

Atlantic White Cedar Swamp: Protect with conservation easement or deed restriction.

Golf courses: Promote "gold coast" golf course aesthetic, that is, "golden" fairways and roughs to improve quality of groundwater recharge and surface runoff and to protect coastal wildlife.

Frost Creek: Eliminate golf course from any tidal wetland areas it may be occupying and restore to intertidal marsh.

Sagamore Hill National Monument: Recommend establishing access to OBNWR through site.

Centre Island: Maintain the barrier land form at Bayville and the connection to Centre Island.

Protect, through appropriate means, the following properties or areas:

Jakobson's Shipyard (5.2 acres): Clean up hazardous materials at site. Redevelop into waterfront park with marine educational facilities.

Oyster Bay Waterfront: Capone (Rial) property (2.16 acres), LILCO site (2 acres), Mill Pond property (2 acres). Provide coastal access. Treat stormwater runoff and discharge from Mill Pond.

Planting Fields-Mill Neck Corridor: Humes property (45 acres), Dean property (86 acres), Silveri property (43 acres). Establish permanently protected corridor from Planting Fields State Park and Arboretum to Mill Neck Creek to provide wildlife habitat, stream corridor and freshwater wetlands protection, coastal water quality benefits, groundwater protection, and native plant community protection.

Oyster Bay Cove: Garver property (51 acres), Held property (9 acres). Add to recent acquisition by county of Schiff property to protect contiguous forested area for protection of watershed and groundwater, chestnut oak forest, wildlife habitat, and potential archaeological site.

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Stillwell Lane Woods (250 acres): Acquire to protect watershed of Cold Spring Harbor, native forest, freshwater wetlands, and wildlife corridor. Should be acquired with Cold Spring Harbor Contributing Area for maximum benefit.

Cold Spring Harbor Contributing Area (66 acres): Acquire to protect watershed of Cold Spring Harbor, native forest, threatened wildlife species (northern harrier and spotted salamander), cross-island greenbelt trail, and Nature Conservancy preserve. Should be acquired with Stillwell Lane Woods for maximum benefit.

Mill Pond Outlet Creek Channel Adjacent Area: Acquire for coastal access, establishment of Mill Pond discharge retention basin and native vegetation buffer area, and installation of interpretive kiosk or gazebo.

Restore the following areas:

Oak Neck Creek: Identify tidal wetland areas lost to filling for possible restoration. Determine the feasibility of containing and removing any contaminants prior to any alterations to the filled areas. Protect breeding osprey and large population of breeding diamondback terrapin.

Mill Pond: Develop native brook trout fishery. Remove street drains to pond or design and install pre-treatment for street runoff. Discourage goose population; provide public access (parking).

Mill Pond Outlet Channel: Create public open space link (via LILCO property to north) with National Wildlife Refuge, and develop interpretive program to include resources of the refuge as well as structures in access corridor (remnants of old grist mill and 1893 power generating plant).

Crab Meadow-Fresh Pond Outstanding Natural Coastal Area

The proposed Crab Meadow-Fresh Pond Outstanding Natural Coastal Area (map 27.0) extends from Long Island Sound west of Blanchard Lake and the park at the terminus of Waterview Street in the Town of Huntington southeast to the entrance drive to the Long Island Lighting Company (LILCO) power plant eastern lagoon, then east along the main entrance drive to the intersection with Eatons Neck Road, west along Eatons Neck Road to a midway point between the previous intersection and the intersection of Eatons Neck Road and Ocean Avenue; from there the boundary runs south to Locust Avenue (a small cemetery lies to the west of this line), whereupon it follows the coastal boundary running east. The proposed ONCA boundary departs from the coastal boundary at Soundview Drive in Fort Salonga, Town of Smithtown, and runs north along Soundview Drive to Beverly Court. It then extends along Beverly Court to the north, crossing Beach Hill Drive, and continues to Long Island Sound.

The municipal boundaries of the towns of Huntington and Smithtown run through the center of the Fresh Pond freshwater wetland system.

Proposed extensions of the state coastal area boundary are shown on map 27.1. The boundary is proposed to be extended to include the area south of Breeze Hill Road and Brookfield Road to Route 25A in Fort Salonga, which contains forest freshwater wetlands and headwaters of the Fresh Pond system, and recreational open space.

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The LILCO facility in Northport, which is the largest oil-fired generating plant in the United States, is immediately to the west of the ONCA. It is excluded from the ONCA because it lacks the requisite natural features. Activities at the plant, however, are significant in the overall ONCA ecosystem; in turn, the plant's proper functioning can be affected by forces of the natural environment.

Application of the Criteria to the Crab Meadow-Fresh Pond ONCA

Criterion 1: Significance of Natural Resources

Although it is located in the urbanized western half of Suffolk County, the Crab Meadow-Fresh Pond ONCA has a relatively high proportion of land in a nearly natural state, and the uplands and surface waters sustain a high diversity and large populations of wildlife, fish, and other freshwater and estuarine organisms.

Ecological and Geological Significance

The ONCA contains a variety of geologic formations that support diverse natural communities: bluffs rising to 100 feet above sea level and morainal hills support remnants of mixed hardwood forests; beaches and dunes support maritime sandy beach and shrubland communities; and coastal lowlands contain a salt marsh, tidal creek, and contributory freshwater wetlands, as well as the freshwater wetlands associated with Fresh Pond. For additional details, refer to the discussion of the Harbors Complex, chapter 3.

The Crab Meadow-Fresh Pond ONCA contains freshwater wetlands and streams that run north, mix with tidal waters, and finally discharge to Long Island Sound. These systems originate from areas where groundwater reaches the surface, but they also are fed by precipitation, overland runoff, and direct road drainage.

Crab Meadow is one of the few large, tidal marshes along New York's Long Island Sound coastline. The nearly 300-acre marsh behind a set of barrier land forms (possibly former baymouth bars) is within a Town of Huntington park. Osprey, a New York State threatened species, nested at Crab Meadow in 1993.

The Fresh Pond freshwater wetland system, at the eastern end of the ONCA, is unusual among Long Island surface waters discharging to the Sound because it remains fresh for most of its length. Fresh Pond discharges to the Sound over a dam at its northern end to a beach that is approximately 400 to 500 feet in width. Portions of the freshwater wetlands surrounding Fresh Pond are included in the Suffolk County Nature Preserve system.

Adjacent to Crab Meadow is the 158-acre Makamah County Nature Preserve, which was acquired for watershed protection and open space. The preserve contains Crab Meadow's eastern tributary and associated freshwater wetlands. Impoundments of the stream form large, shallow ponds and red maple-hardwood swamps. A mixed hardwood forest, dominated by oaks and hickories, lies adjacent to the freshwater wetlands.

Blanchard Lake is at the western end of the ONCA. The lake and its associated freshwater wetlands are about 16 acres in size.

A right-of-way carrying power lines from LILCO's Northport power plant traverses the ONCA watershed in a southerly direction. Forested, with sections of freshwater wetlands, the right-of-way provides a wildlife corridor through residential areas, though the land is not officially recognized or managed as "open space."

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The ONCA contains coastal barrier land forms. The two at the mouth of Crab Meadow's creek are protected under the Coastal Barrier Resource System. The entire coastline of this ONCA is identified by New York State as a natural protective feature under the Coastal Erosion Hazard Area Act. The shoreline has high hazard potential. Because of historic high

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27.0 Crab Meadow-Fresh Pond Outstanding Natural Coastal Area

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rates of shoreline erosion in this ONCA, the majority of the shoreline has been hardened with man-made stabilization structures.

The following designations, programs, and plans are applicable within this ONCA:

USFWS Significant Coastal Habitat: The ONCA contains a portion of the "Three Harbors Area" Significant Coastal Habitat identified by the U.S. Fish and Wildlife Service (USFWS) in 1991. Appendix 6 contains the full Three Harbors Area site description and map. Appendix 6 provides information from the Northeast Coastal Areas Study regarding the selection of the Significant Coastal Habitats.

New York State Significant Coastal Fish and Wildlife Habitat: The ONCA contains one Significant Coastal Fish and Wildlife Habitat, as designated under Article 42 of New York's Executive Law: Crab Meadow. Chapter 3 contains details of this habitat unit.

New York Open Space Conservation Plan: "Conserving Open Space in New York State," produced pursuant to State Land Acquisition, ECL, Article 49, Title 2. In addition to the sites listed in the plan, the Region 1 Land Acquisition Advisory Committee recommended one site, the "Waterside Avenue Wetlands," for acquisition. These privately held freshwater wetlands contribute to Crab Meadow and lie to the south below the western end of the marsh.

New York State regulated tidal wetlands (Tidal Wetlands Act, ECL, Article 25): Refer to chapter 3 for a detailed description of wetland resources.

New York State regulated freshwater wetlands (Freshwater Wetlands Act, ECL, Article 24): Refer to chapter 3 for a detailed description of wetland resources.

Coastal Barrier Resource System protected units (federal Coastal Barrier Resources Act). Refer to chapter 3 for a detailed description of coastal barrier resources.

Local Waterfront Revitalization Programs: A draft joint LWRP has been prepared for the Town of Huntington and the villages of Asharoken, Huntington Bay, and Northport. The Village of Lloyd Harbor will have an approved LWRP in 1995. The Town of Smithtown's LWRP was approved in 1989. The Town of Smithtown, in its LWRP, supports public acquisition of the privately owned portions of the Fresh Pond freshwater wetland system.

Suffolk County Open Space Program: The county included the Fresh Pond wetlands among areas targeted for acquisition in its open space program; only certain northern portions presently are in county ownership.

Significance of Cultural Resources

The Town of Huntington owns recreational parks for residents at Crab Meadow Beach, Crab Meadow Park and Golf Course, and Geissler's Beach. North of Blanchard Lake lies the town's Kirschbaum property, an undeveloped park on Long Island Sound made up of 13.9 acres of beach, pond, trees and grass. The town is proposing the site be used for camping.

Suffolk County owns approximately 25 acres of nature preserve land around Fresh Pond. The pond is used for ice skating and fishing, but access is limited by parking availability.

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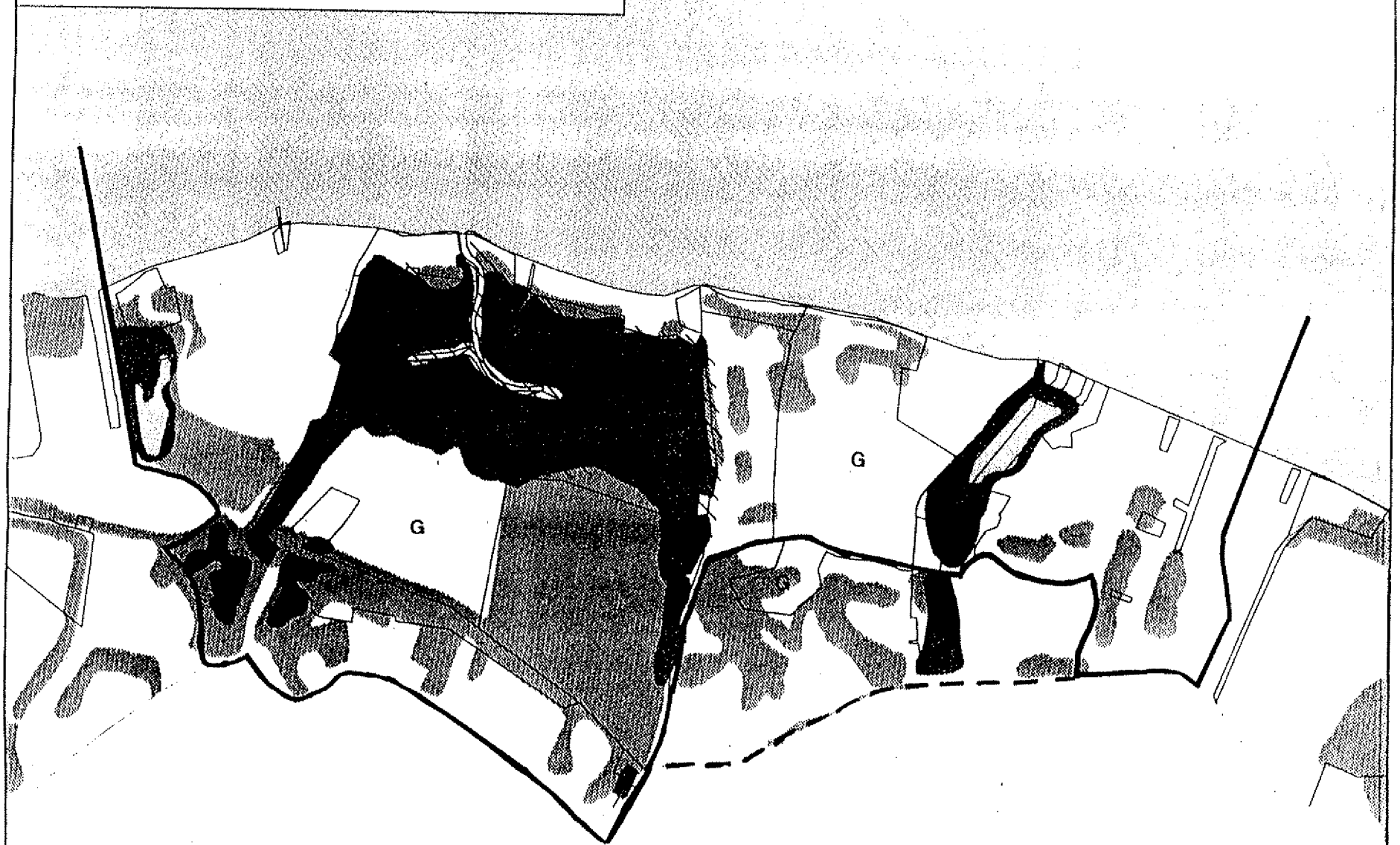
Crab Meadow - Fresh Pond Outstanding Natural Coastal Area

MAP 25.0



Legend

- ONCA Boundary
- Proposed ONCA Extension
- Protected Open Space
- G Golf Course
- Vegetated Wetlands
- Naturally Vegetated Uplands
- Significant Coastal Fish & Wildlife Habitats
- Dunes

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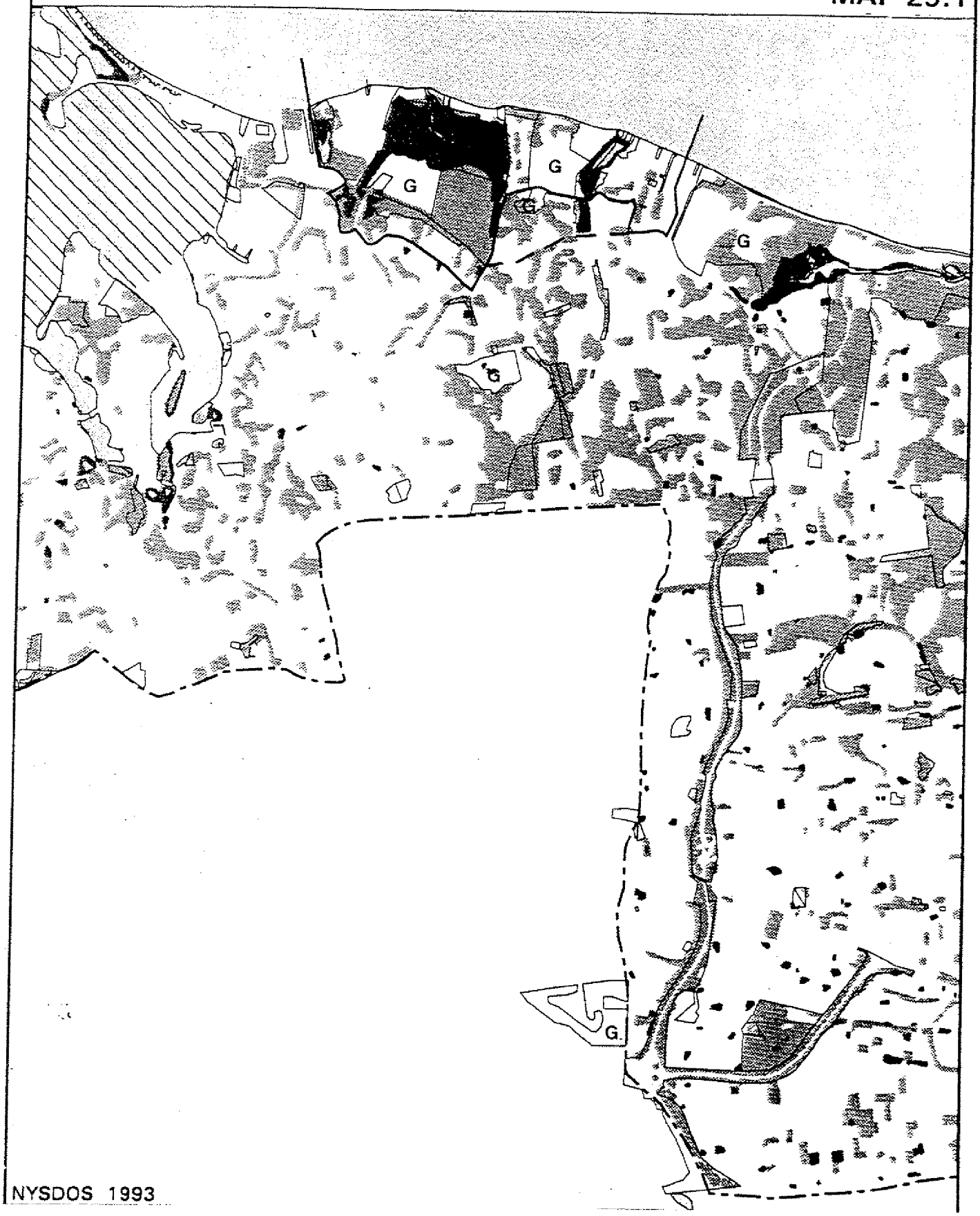
Crab Meadow - Fresh Pond Outstanding Natural Coastal Area with Watershed Detail

ONCA Boundary
Proposed ONCA Extension
Protected Open Space
G Golf Course
Vegetated Wetlands
Naturally Vegetated Uplands
Watershed Boundary
Significant Coastal Fish & Wildlife Habitats
Dunes

MAP 25.1



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27.1 Crab Meadow-Fresh Pond Outstanding Natural Coastal Area with Watershed Detail

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Largemouth bass, white perch, pumpkinseed sunfish, and alewives were found in Fresh Pond during a 1988 survey by NYSDEC Bureau of Fisheries. Alewives, which are anadromous, find their way into Fresh Pond from Long Island Sound in the spring for spawning. Although they are not game fish, the young alewives provide excellent food for the largemouth bass and white perch. Local residents, enthusiastic about the arrival of alewives, have been known to scoop them up in buckets as they come up the creek that crosses the beach and assist them over the dam into Fresh Pond.

Recreational fishing also is available in Long Island Sound. The Sound offers opportunities to catch a variety of saltwater fish, including bluefish, striped bass, tautog, porgy, flounder, fluke, weakfish, and snapper. Access to the waters of Long Island Sound for day fishing is available at Geissler's Beach. In this area, the Sound also is used for trolling, party boats, and some commercial fishing.

Nearby Smithtown Bay is a popular and productive duck hunting area.

Blanchard Lake is mostly on LILCO-owned property, but some of the east shore of the lake is privately owned. A small community park and boat ramp are maintained by local residents. The pond is used for ice skating in the winter.

General public access to the coast is limited primarily by residency requirements at town beaches and parks. Although day fishing along Long Island Sound is permitted at Geissler's Beach, a seasonal beach sticker is required for access to the area from Memorial Day to Labor Day because parking space is limited. Attempts to improve access, especially at Fresh Pond and Makamah County Nature Preserve, must be controlled carefully to avoid conflicts with natural resources protection.

The primary land use in the ONCA and its extended area is low-density residential (one dwelling unit or less per acre), which is nearly equaled in acreage by open space and recreational land uses. Residential use in densities of two to four dwelling units per acre is the next most prevalent, followed by "vacant" land. There is a small amount of commercial development along Route 25A at the southern boundary of the ONCA.

The Town of Huntington has identified several scenic vistas within the ONCA in its LWRP. Open, unobstructed views of Long Island Sound are available to town residents at Crab Meadow Beach, Geissler's Beach, and Crab Meadow Golf Course. On clear days, Connecticut's shoreline is visible. Views over the Crab Meadow marsh also are accessible from the southern and eastern portions of Crab Meadow Beach. An osprey pole, complete with nest and osprey, was visible from the southeast corner of the beach parking lot in the spring of 1993.

The Town of Smithtown LWRP notes that Fort Salonga Road (a portion of Route 25A) is a designated State Scenic Highway. In the Town of Smithtown, the remains of Fort Salonga, used during the Revolutionary War, are located near British Colony Road. A house once kept as a summer home by the founder of Tuskegee Institute, Booker T. Washington, is on a bluff overlooking Long Island Sound in Fort Salonga. Six additional historic sites in Fort Salonga have been identified in the Smithtown Historic Sites Inventory and are listed in the town's LWRP. The Fort Salonga area contains a town historic district.

All but a small southern portion of the ONCA are described in New York State Museum Archaeological Site Files. The ONCA is considered to possess "multiple site sensitivity," because of archaeological and historic resources. These designations are testimony to the

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long-standing connection between the natural resources of the ONCA and the attractiveness for human uses.

Criterion 2: Resources at Risk

Historic and current human use of the Crab Meadow-Fresh Pond ONCA has altered the landscape, adversely affecting ecosystem functions. Development has destroyed and fragmented natural communities, particularly in the last 40 to 50 years. About 20 percent of all of the Town of Smithtown's natural wetlands were destroyed since the late 1940's through development.

Although all of the Crab Meadow-Fresh Pond ONCA's saline waters are classified SA, portions do not meet the standards for this classification. Crab Meadow's creek is closed to shellfishing, because it does not meet standards for coliform bacterial levels.

Nonpoint source pollution from groundwater contamination and stormwater runoff appears to be a major contributor to water quality deterioration. Two New York State Department of Environmental Conservation Inactive Hazardous Waste Sites are located in the groundwater contributing area of the Crab Meadow-Fresh Pond ONCA. One is an open dump south and west of Old Northport Road and east of Town Line Road, owned by S. P. Materials. It is in the sub-watershed of the Fresh Pond system. An investigation report assessing environmental problems is under review. Soil and groundwater sampling is required to evaluate potential exposure pathways.

The Huntington Landfill, closed in 1989, is the other inactive hazardous waste site in this ONCA. Groundwater and, consequently, private residential wells down gradient of the landfill show contamination with PGE and leachate indicators. Across from the site, private well samples showed high levels of chlorides, iron, manganese, and ammonia. Monitoring wells at the landfill site have shown organic and inorganic contamination. The landfill is scheduled for an early capping program. Design for capping was due in March 1993, pending further characterization of the landfill plume.

The LILCO power generating plant to the west of the ONCA discharges heated water into Long Island Sound, raising the ambient water temperature approximately 13 degrees centigrade, but it operates within federal and state thermal discharge limits. Shellfishing is prohibited at the plant's intake and discharge lagoons. Oil is transported by tankers to LILCO's offshore oil loading platform. Except for a few oil spills over the last 15 years, the Long Island Sound waters adjacent to the ONCA have been relatively free of chemical pollutants.

Water quality in this ONCA also is threatened by alterations to the tributaries, sometimes for the specific purpose of directing road drainage to them. For example, the headwaters area of the freshwater wetland system in Makamah County Nature Preserve has been altered to form a recharge basin that receives road runoff and, therefore, sediment and contaminants.

The freshwater wetland adjacent area at the Fresh Pond headwaters is threatened with commercial development. Property along Route 25A, partially comprised of freshwater wetlands, is zoned for neighborhood business. This area and Route 25A, immediately to the south, flood frequently, even though a drainage ditch leads from the highway right-of-way north toward a deciduous swamp. Backyards along the wetland, as well as the parking lot of a shopping center across Route 25A from the wetland's adjacent area, also become flooded. Development in Fresh Pond's watershed, which is large relative to the size of the

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wetland, increases the rate of runoff funneled to this constricted and impounded system, carrying sediment and contaminants from a large area and lowering the quality of the surface water.

The tidal marsh at Crab Meadow, although large and undeveloped, has been impaired by extensive mosquito ditching. The ditches, which drain the marsh of shallow pools of standing water where mosquitos breed, also have reduced the number of acres supporting intertidal marsh. Nearly half of Crab Meadow now is high marsh, which is less productive biologically.

Portions of tidal wetlands in the ONCA are dominated by the nonnative common reed, Phragmites australis. This species is an invasive pest because it aggressively replaces native species of much higher wildlife value, especially in previously disturbed wetland areas. Though difficult to control, it must be eradicated to restore wetland functions.

The Crab Meadow Park Golf Course and Country Club is a 408.7-acre recreational facility adjacent to the Crab Meadow marsh. The Indian Hills Country Club lies immediately to the west of and across a narrow road from Fresh Pond. Together, these areas represent large portions of the ONCA in partially natural open space, but maintenance practices at these two golf courses contribute contaminants and increase the nutrient load to the wetlands. In addition, the land use itself has caused the elimination of forested upland buffer areas, which provide important wildlife habitat and assist in pollution attenuation.

At Blanchard Lake, fishing is limited by the lake's low dissolved oxygen levels during summer months, which few fish species can tolerate. High nutrient levels causing this condition have not been linked as yet to a specific source.

Incremental clearing and clear-cutting for development have reduced much of the former large forested areas in the ONCA into fragments. Such fragmentation has potentially devastating effects on wildlife species. Relatively large forested holdings remain, however, on the publicly owned lands, the southern portion of the Indian Hills Country Club, and along the LILCO power line right-of-way. The remaining large forested area surrounds the freshwater wetlands contributing to Crab Meadow at the western portion of the ONCA. This forest land is privately held, and therefore is available for development.

A large old field area lies south of Blanchard Lake. Two others are outside the ONCA on the adjacent LILCO property. Only two, relatively small, agricultural areas remain in the ONCA. Such areas require active management to offset the eventual succession to forest, if old field wildlife species are to be sustained.

For the most part, other portions of the ONCA available for development pose severe constraints, such as freshwater wetlands, steep slopes, and flood hazards. These areas mostly are forested. They buffer the wetlands and surface waters of the ONCA from sedimentation arising from erosion and attenuate nutrient and contaminant loading.

People inhabit and play in nearly all the different geologic formations in this ONCA. Public and private erosion control projects, requiring significant expenditures, have altered coastal land-shaping processes. Although a great deal of the ONCA's shoreline is hardened with man-made structures, many houses in the ONCA are in danger of being damaged by bluff erosion. Many already have lost large portions of their backyards.

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Beach fortification fronts houses at Makamah Beach along Waterview Street East. The Town of Huntington built a revetment at the east end of the beach, but now proposes to move the revetment south, because erosion already has scoured the area behind it. In addition, the revetment is thought to have impaired beach sand replenishment to the west. Because hardened shorelines may deprive beaches down drift of an adequate sand supply by trapping sand that sloughs from bluffs, protection of the beach houses at Makamah Beach may be adversely affecting normal beach nourishment to the west. Further fortification could intensify the negative impacts and cause a loss of beach benefits to the public as well as to the home owners.

A jetty at Crab Meadow's creek mouth, others at the LILCO plant, and groins along the shore west of Crab Meadow may be capturing sand moving to the west along this stretch of Long Island Sound's shoreline. As a result, Asharoken Beach, even further to the west, is being deprived of its normal sand supply. The narrowing of the beach at Asharoken threatens access to Eatons Neck.

At Crab Meadow Beach, natural shoaling resulting from a tidal delta formation at the mouth of the creek may provide the shoreline with added protection from wave energy. Yet, an active town bulldozing program removes these shoals to prevent pockets of deep water off shore at low tide. It is unclear whether the shoals, left undisturbed, could be a supply source for sand eroding at the western portion of Crab Meadow Beach.

Criterion 3: Additional Management Measures Needed

Within the coastal area and proposed extended boundaries of this ONCA are several governmental jurisdictions: New York State, Suffolk County, and the towns of Huntington and Smithtown. Agreement and cooperation among these levels of government, hand-in-hand with the citizens they represent, are imperative for real protection of an outstanding coastline. Research, long-term monitoring, education, open discussion, and long-term planning can provide the communication necessary for such cooperative ventures to be sustained.

The Town of Huntington joint LWRP needs to be completed. This program would incorporate the management measures needed to protect the resources of the ONCA. The Town of Smithtown LWRP also needs to incorporate management measures for the ONCA. Both towns need to prepare harbor management plans and coordinate their efforts to reach consensus among agencies. The plans, backed by the legal authority of the LWRPs, could achieve coordinated regulation of all uses of surface waters and underwater lands in the towns, and, thus, in the ONCA.

Through state management, all levels of government, as well as citizens, could cooperate within a unified framework to protect the resources of the Crab Meadow-Fresh Pond ONCA. Management should recognize that people and their activities are an integral part of this natural area. Guidance, restrictions, implementation, and enforcement should be included to reduce deleterious human impacts on this coastal area and restore natural communities and processes.

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Specific Actions Needed

Develop a comprehensive management plan for the Crab Meadow-Fresh Pond Outstanding Natural Coastal Area. Extend the coastal boundary to include areas shown on map.

The following specific planning and management actions are needed:

Sediment Transport Study: Conduct a sediment transport study to determine the role of the Crab Meadow creek tidal delta in beach nourishment at Crab Meadow and to the west, as well as the magnitude of the impacts created by the groins and jetties in the ONCA in Asharoken Beach erosion. Should the marsh at Crab Meadow be restored, consideration should be given to the resulting hydrologic regime before sediment transport alterations along the beaches are designed.

The following site-specific actions should be included in the management plan, but may be undertaken while the plan is being prepared:

State Route 25A: Tighten controls on curb cuts. Require that the section of highway traversing the ONCA watershed carry mandates for permeable areas of native vegetation as well as limits on road-side signs and other aesthetic insults.

Fresh Pond: Provide improved fishing access. Evaluate present dam structure and repair, modify, or replace, as appropriate. Evaluate Fresh Pond system for possible designation as a Significant Coastal Fish and Wildlife Habitat.

Crab Meadow Park and Golf Course: Encourage town to make significant efforts to change maintenance practices that are damaging to receiving waters; promote a new "coastal aesthetic" for golf courses to counteract the strong desirability of high-maintenance, unnaturally green fairways.

Indian Hills Country Club: Encourage establishment of a wildlife corridor through establishment of native plantings on the property to link Fresh Pond and Crab Meadow. Encourage changes in maintenance practices to protect water quality.

Protect, through appropriate means, the following properties or areas:

Waterside Avenue Wetlands (approximately 34 acres): Acquire the freshwater wetlands and surrounding forest at the headwaters of the west tributary to Crab Meadow recommended by the Region 1 Land Acquisition Advisory Committee for protection of wildlife habitat, water quality, and open space.

Fresh Pond Headwaters and Buffer Area: Acquire freshwater wetlands and adjacent area between Route 25A and Fresh Pond that are in private ownership for flood control, protection of freshwater wetlands, surface water quality, wildlife habitat, and open space purposes.

Restore or remediate the following:

S. P. Materials Inactive Hazardous Waste Site: Complete necessary investigations and remediation.

Huntington Landfill Inactive Hazardous Waste Site: Complete necessary investigations and remediation.

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Crab Meadow: Design and implement a tidal wetlands restoration project to counteract the effects of mosquito ditching on the low marsh. Evaluate open water marsh management as an alternative for mosquito control. In addition, evaluate headwaters area of eastern tributary for possible restoration from recharge basin to red maple-hardwood swamp or emergent marsh. Devise appropriate alternative treatment of road drainage (restoration of Crab Meadow was recommended in the Long Island Sound Study Comprehensive Conservation and Management Plan).

Blanchard Lake: Determine causes of seasonally low oxygen levels, which limit the survival of aquatic organisms. Remediate, as appropriate.

Stony Brook-Setauket Outstanding Natural Coastal Area

The Stony Brook-Setauket Outstanding Natural Coastal Area (map 28.0) extends from a point along the Long Island Sound shoreline west of Wilderness Road in the Village of Nissequogue, south along the watershed divide to the coastal boundary along Route 25A in the Village of Head-of-the-Harbor, then runs northeast along the coastal boundary into the Village of Old Field, then south and east through Setauket, East Setauket, and the Village of Poquott along the coastal boundary to Washington Street. It then runs northeast along Washington Street to the shoreline, whereupon it crosses Port Jefferson Harbor to Pine Road in the Village of Belle Terre. It then follows Arbutus Road to Camp Woodbine Road, then follows Crooked Oak Road to Seaside Drive, then extends northeast to the shore at White Beach.

Because they lack the requisite features, neither lower Port Jefferson Harbor and the Village of Port Jefferson nor the southeastern portions of the Village of Belle Terre are included in the ONCA. Human activities in these areas do, however, play a significant role in the overall ONCA ecosystem. In turn, many of these human activities are affected by the ability of the ecosystem to perform its natural functions.

Proposed extensions of the state coastal area boundary are shown on map 28.0. The boundary is proposed to be extended beyond the existing coastal boundary to include the headwaters and freshwater wetland systems discharging to the bays and harbors of the ONCA, forested areas of the Village of Old Field that protect groundwater recharge and lie over the peninsula's surface watershed divide, and historic districts in Stony Brook, Setauket, and East Setauket.

Application of the Criteria to the Stony Brook-Setauket ONCA

Criterion 1: Significance of Natural Resources

Although it is located in the western half of Suffolk County and is within one of New York's urban areas, the Stony Brook-Setauket ONCA has a relatively high proportion of undeveloped land. The uplands and surface waters sustain a high diversity and large populations of wildlife, fish, and other freshwater and estuarine organisms.

Ecological and Geological Significance

The ONCA contains a variety of geologic formations that support diverse natural communities: morainal hills reaching 200 feet above sea level support mixed hardwood forests, including chestnut oak forests; headlands with spits and baymouth bars, beaches, dunes, and bluffs that support maritime sandy beach and shrubland communities, and remnants of maritime red cedar forests; bays containing marine subtidal, intertidal, and salt marsh communities; and tributaries to the bays containing tidal creeks and freshwater

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wetlands. Freshwater impoundments contain emergent marsh communities and ponds. For additional detail, refer to the discussion of the Central Bays Complex in chapter 3.

Groundwater in the ONCA flows through shallow discharge zones toward the surface waters of the harbors, bays, and Long Island Sound. Numerous fresh springs and wetlands are present in areas where the water table intersects the surface. The waters of the resulting freshwater wetlands and streams run north, mixing with tidal waters and ultimately discharging to the harbors and bays. Although these systems originate from groundwater discharge, they also receive overland runoff and direct road drainage. Several areas of the streams are impounded, creating ponds. Most of the wetlands are regulated by the state and local governments.

Stony Brook Harbor, West Meadow Creek, and Flax Pond contain the largest tidal marshes; Conscience Bay and Old Field Preserve are fringed with significant tidal marsh acreage. The Bartlett Marsh and Aunt Amy's Creek (tributary to Stony Brook) are freshwater wetland systems contributing to Stony Brook Harbor. Two smaller freshwater tributaries lead to Setauket Harbor. Port Jefferson has a creek that empties into the lower harbor.

The freshwater wetlands and ponds of the Setauket Mill Pond system contribute to Conscience Bay. This system, which is the largest of the freshwater wetlands in the ONCA, and has the largest drainage, provides habitat for a variety of waterfowl. It also offers warm water fishing and other passive recreational opportunities.

Several small ponds and swamps are in the ONCA watershed. Each is important to maintain in its most natural state for wildlife, because of the relative scarcity of freshwater resources in this portion of the Long Island Sound coastline, especially in the northern portions of the peninsulas. One small wooded swamp in Old Field, partially filled prior to regulatory protection, provides habitat for wood duck, roosting black-crowned night heron and snowy egret, and breeding mallard and amphibians.

State, county, town, and village preserves and open space parks lie within the ONCA watershed. The state owns a tidal wetlands conservation area at Flax Pond in Old Field and another along Strong's Neck. The state also owns an open space corridor extending to the east from Route 25A in Setauket, held as a right-of-way for a "paper" highway spur. The State University of New York at Stony Brook (SUNY-Stony Brook) owns "Sunwood," the former Frank Melville estate in Old Field, a forested tract facing Smithtown Bay.

Local governments also have acquired many parcels for open space and conservation purposes. Suffolk County owns the undeveloped McAllister County Park (76 acres) in Belle Terre. The Town of Brookhaven owns parkland on Old Field Preserve in Old Field and most of the West Meadow Beach barrier spit. The Village of Old Field owns most of the remainder of Old Field Preserve; the county owns the eastern tip, which is designated as a county bird sanctuary. The Town of Smithtown owns large portions of the Long Beach barrier spit; the Village of Nissequogue owns the eastern most 27-acre portion which is a wildlife refuge. All the villages own individual small parcels scattered throughout their municipal limits.

Relatively large proportions of overall land area in the villages of Nissequogue and Head-of-the-Harbor are devoted to open space, held in a variety of ownerships: 144.4 acres (8.8%) in Head-of-the-Harbor, and 395.7 acres (17.2%) in Nissequogue.

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Most of SUNY-Stony Brook's 1,100-acre campus is situated within the ONCA's watershed. Much of the campus is densely wooded. Its predominant forest cover-type is Appalachian oak-hickory forest.

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28.0 Stony Brook-Setauket Outstanding Natural Coastal Area

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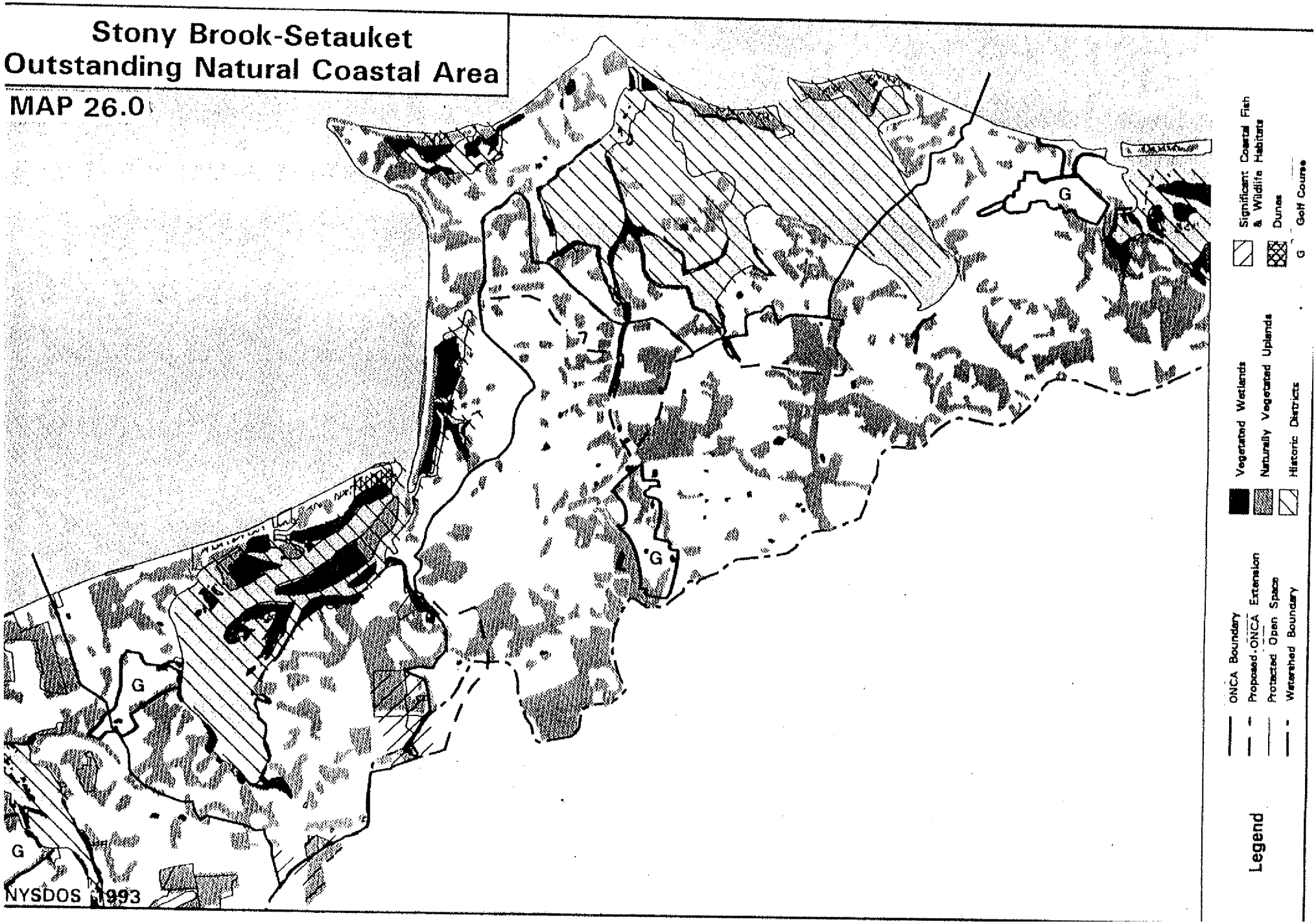
Stony Brook-Setauket Outstanding Natural Coastal Area

MAP 26.0



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Private and semi-private organizations, including the Society for the Preservation of Long Island Antiquities, the Stony Brook Community Fund, the Stony Brook Foundation, the Frank Melville Memorial Foundation, and the Three Village Garden Club own tracts of open space throughout the ONCA. The Stony Brook Community Fund has an agreement with the Three Village School District allowing the use of a Marine Biology Facility at the West Meadow Wetlands Preserve, which is approximately 80 acres in size. For 33 years, summer classes, primarily for high school students, have been supported there.

A right-of-way carrying power lines from the Long Island Lighting Company power generating plant in Port Jefferson contains old field vegetation and provides a wildlife corridor through residential areas, although the land is not officially recognized or managed as "open space." The Nature Conservancy maintains three preserves in the ONCA and its extended area and watershed: the David Weld Sanctuary in Nissequogue, East Farm Preserve, and land along Fifty Acre Road in Head-of-the-Harbor. Suffolk County owns the development rights to farm property adjacent to the East Farm Preserve.

The New York Natural Heritage Program has identified 12 heritage element occurrences within the boundaries of the Stony Brook-Setauket ONCA. They include nesting sites of piping plover, least tern, and common tern and the marine rocky intertidal community, which is rare in the state. The marine rocky intertidal area in this ONCA is a research site for the study of seaweeds.

Long Island Sound coastal waters are critical developmental habitat for the Kemp's ridley sea turtle, a species that is listed by the state and federal governments as endangered. The turtles have been tracked with radio telemetry by the Okeanos Ocean Research Foundation into the waters of West Meadow Creek. Okeanos has found that the loggerhead sea turtle, a federally designated threatened species, also uses Long Island Sound coastal waters and West Meadow Creek. The diamondback terrapin, which is a designated special concern species in New York, occurs in Conscience Bay and probably breeds there, according to Okeanos. It also has been reported to occur in Stony Brook Harbor, and local experts have confirmed terrapin breeding in West Meadow Creek and its tributary, Aunt Amy's Creek.

There are seven barrier spits in this ONCA, including three that are within protected units of the Coastal Barrier Resource System. These and other geologic formations in the ONCA, such as shoals, dunes, and bluffs, are natural protective features that protect the bays and coastal properties from flooding and erosion hazards. A large proportion of the coastline on the Sound within this ONCA is designated by the state as a Coastal Erosion Hazard Area, much of which is held in public ownership. Bluff areas on the west side of Old Field and residential areas along the Nissequogue bluffs and the Long Beach barrier spit are notable exceptions.

The following designations, programs, and plans are applicable within this ONCA:

USFWS Significant Coastal Habitat: The ONCA contains a portion of the "Port Jefferson-Stony Brook Harbor Complex" Significant Coastal Habitat identified by the U.S. Fish and Wildlife Service (USFWS) in 1991. Appendix 6 contains the full Three Harbors Area site description and map. Appendix 6 provides information from the Northeast Coastal Areas Study regarding the selection of the Significant Coastal Habitats.

New York State Significant Coastal Fish and Wildlife Habitats: The ONCA contains five Significant Coastal Fish and Wildlife Habitats, as designated pursuant to Executive

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Law, Article 42: Stony Brook Harbor and West Meadow; Flax Pond, Conscience Bay, Little Bay, and Setauket Harbor; Port Jefferson Harbor; and Port Jefferson Beaches. Chapter 3 contains details of these habitat units.

New York Open Space Conservation Plan: "Conserving Open Space in New York State," produced pursuant to State Land Acquisition, ECL, Article 49, Title 2. In addition to the sites listed in the plan, the Region 1 Land Acquisition Advisory Committee recommended 235 acres within Stony Brook Harbor for public acquisition/ protection. The suggested area is considered suitable for inclusion in the National Wetlands Priority Conservation Plan and was included in a region specifically designated as important for migratory birds. In addition, the area offers unique vistas, the opportunity to consolidate open space, and access to the coast. The state owns the underwater lands and formerly underwater lands of Stony Brook Harbor, so purchase would focus on uplands and upland buffer areas. This proposal should be evaluated further to determine if these components are in need of additional protection through acquisition, or to reassert state ownership of formerly underwater filled lands.

New York State regulated tidal wetlands (Tidal Wetlands Act, ECL, Article 25): Refer to chapter 3 for a detailed description of wetland resources.

New York State regulated freshwater wetlands (Freshwater Wetlands Act, ECL, Article 24): Refer to chapter 3 for a detailed description of wetland resources.

Coastal Barrier Resource System protected units: (federal Coastal Barrier Resources Act). Refer to chapter 3 for a detailed description of coastal barrier resources.

Local Waterfront Revitalization Programs: A draft LWRP has been prepared for the Town of Brookhaven. The Village of Head-of-the-Harbor has a joint LWRP with the Village of Nissequogue that was approved in 1991. The Town of Smithtown's LWRP was approved in 1989.

Significance of Cultural Resources

Port Jefferson Harbor supports commercial and recreational fishing. It is a major New York port area for trawlers, lobster boats, clam boats, and party/charter boats focused on Long Island Sound fisheries. The waters of this ONCA themselves also are used to a limited degree for commercial hard and soft clamming and oyster harvesting. The overall harvest for the Town of Brookhaven's north shore hard clam harvest areas was 3,990 bushels in 1991 and 4,639 bushels in 1992. Almost the entire hard clam harvest is from Conscience Bay and Port Jefferson Harbor. The oyster harvest in the town's north shore areas totaled 33,579 bushels in 1991 and 19,874 bushels in 1992. Oysters, hard clams, and soft clams are also harvested primarily from Stony Brook Harbor.

The western portions of this ONCA support environmental education activities that supplement science classes in local schools, and foster understanding and stewardship of—and, potentially, careers in—estuarine resources. A BOCES/SCOPE program entitled "Farming the Sea: A Hard-Shelled Clam Mariculture Project" involves high school students from Hauppauge, Kings Park and Comsewogue in growing and replenishing hard clam stocks in Stony Brook Harbor. This ten-year program is so successful that it recently expanded to Mount Sinai Harbor.

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Natural resources of the Stony Brook-Setauket ONCA are used in scientific studies conducted by programs at SUNY-Stony Brook. Research areas include sediment transport, mariculture, wildlife, finfish, and marine algae. SUNY-Stony Brook's Marine Sciences Research Center operates an educational field research station at Flax Pond.

An attic room above the Stony Brook Post Office was the location of the first office of the Environmental Defense Fund, now a national nonprofit environmental organization, that was responsible for the scientific studies and litigation that led to the historic banning of the pesticide DDT.

The bays of the Stony Brook-Setauket ONCA are recognized by the public as outstanding areas for water-dependent and water-related recreational activities, such as fishing, boating, sailing, shellfishing, and bird watching, and are used heavily. Local ordinances prohibit the discharge of firearms in most uplands. Stony Brook Harbor and Smithtown Bay are used heavily by waterfowl hunters.

The Town of Brookhaven provides parks for residents at Stony Brook Harbor (launching ramp, bathing beach, fishing pier), West Meadow Beach (bathing beach), Setauket Harbor (launching ramp), and Port Jefferson Harbor (marina, launching ramp). In its draft LWRP, the Town of Brookhaven expressed a desire to restore public access to a town-owned parcel in the Village of Old Field that served as a boat launch on Conscience Bay.

The Town of Smithtown operates a marine park and beaches on the north side of Stony Brook Harbor on the Long Beach barrier spit. Privately owned recreational facilities, such as beach clubs and yacht clubs, are scattered throughout the ONCA.

General public access to the coast in this ONCA is limited by parking restrictions enforced by the towns and villages. Boaters represent a significant proportion of users of the more remote beaches, which are accessible only by water or by foot. The Stony Brook historic district and harbor front is featured in Short Walks on Long Island, a guidebook by Rodney and Priscilla Albright that encourages exploration of varied natural and historic features in the Long Island landscape.

The primary land uses in the ONCA, its extended area, and its watershed are low and medium density residential, vacant, open space/recreational, and institutional. The institutional lands are primarily held for conservation or historic preservation, although some are school properties.

Fields and large remnants of mixed hardwood forests are in private ownership in the large estates remaining in the Stony Brook-Setauket ONCA. The Village of Head-of-the-Harbor has approximately 33 percent of its residential land in estate holdings. The Village of Nissequogue has approximately 40 percent of residential land in estates. Both of these villages have listed their selections of locally important natural areas in their joint LWRP.

The extensive holdings of land for conservation or historic preservation purposes by private and semi-private organizations in this ONCA point to a desire among local residents to maintain the area's "sense of place." Large wooded properties, farms, and old fields throughout the ONCA, extended ONCA, and its watershed yield views of bays, coves, tidal marshes, creeks, ponds, bluffs, beaches, distant land horizons, and expansive vistas over Long Island Sound. The coastline views are dramatic and give a feeling of bucolic isolation.

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The towns and villages have identified numerous scenic vistas within the ONCA in their LWRPs. Wildlife resources are abundant and also offer many captivating visual experiences.

The historic atmosphere maintained in the Stony Brook-Setauket ONCA is appreciated by residents and attractive to visitors. The character of the ONCA's populated areas ranges from village streets to country lanes to graceful estates to rural seclusion and farmland. Historic and architecturally significant structures throughout the ONCA complement the landscape to complete the blend of cultural and natural resources that engenders this ONCA's unique character.

Four Town of Brookhaven historic districts lie within or partly within the ONCA: Stony Brook, Old Setauket, Dyer's Neck, and East Setauket Historic Districts. The Hawkins Homestead (also known as the Captain Eleazer Hawkins House), built ca. 1660, is on the State and Federal Register of Historic Places. Portions of three National Register historic districts lie in Head-of-the-Harbor along Route 25A. The Village of Nissequogue has designated the entire village area a local historic area. Fourteen properties in Nissequogue and Head-of-the-Harbor are listed in the State Register as Stony Brook Harbor Estates Thematic Resources. These properties all represent estate development on Stony Brook Harbor between 1878 and 1930. A nomination has been forwarded to the National Park Service for thematic designation on a national level.

Large areas within the ONCA are described in New York State Museum Archaeological Site Files. Virtually all of the land area in the ONCA possesses "multiple site sensitivity," because of archaeological and historic resources. These designations are further testimony to the long-standing connection between the natural resources of this ONCA and the area's attractiveness for people.

Significant archaeological sites in the ONCA are located primarily along the water. An area along the bay in Old Field has been identified by the New York State Historic Preservation Office as sensitive. The Town of Brookhaven has listed 18 culturally significant sites within the coastal area that include prehistoric camp sites, shell middens, and burial grounds. The villages of Head-of-the-Harbor and Nissequogue are especially rich with significant archaeological sites.

Cultural resources in this ONCA include the Museums at Stony Brook, which is Long Island's largest private museum. It is comprised of three museums and several historic buildings on a 9-acre site. Among the collections for which it is known are the comprehensive works of William Sidney Mount, a 19th century American artist who painted landscapes and images of rural agrarian life, which feature many of the farms on the north shore of Long Island. Another attraction is its internationally acclaimed collection of 250 horse-drawn vehicles.

Criterion 2: Resources at Risk

Historic and current human habitation of the Stony Brook-Setauket ONCA has altered the landscape, adversely affecting ecosystem functions. Past and present land uses in the ONCA watershed, including industrial activities in Port Jefferson and Port Jefferson Station, have resulted in primary, secondary, and cumulative impacts on the ONCA's natural ecological communities, and hence on Long Island Sound's ecosystem and people's quality of life.

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Water quality in this ONCA is threatened by degraded conditions in the embayments and their tributaries, resulting from heavy boat traffic, vessel discharges, point source discharges of pollutants, and nonpoint source pollution. Although all of the Stony Brook-Setauket ONCA's bays and harbors are classified SA, except for lower Port Jefferson Harbor (Class SC), portions do not meet their use standards. Little Bay, Setauket Harbor, the southern half of Conscience Bay, the southern end of Port Jefferson Harbor, West Meadow Creek, and portions of Stony Brook Harbor are uncertified shellfish areas, because they do not meet National Shellfish Sanitation Program standards for coliform bacterial levels. Combinations of stormwater runoff, failing septic systems, wildlife, vessel discharges, and sewage effluent contribute to the high coliform levels.

The Village of Head-of-the-Harbor is developing a stormwater control project for village roads to abate nonpoint source pollution in Stony Brook Harbor. The runoff control program is likely to have positive effects, but the problem of nonpoint source pollution reaching the ONCA's surface waters is pervasive, and must be managed on a watershed as well as a water body basis.

The Setauket Mill Pond, an impounded section of the largest freshwater wetland system in the ONCA, receives stormwater through direct discharges from storm drains and from its headwaters, which have been channelized to collect discharges from drains in the upper watershed. The release of large amounts of sediment into the pond is evidenced by long-lasting turbidity following heavy rain and by deltas of sediment in the pond at the discharge points. Lawn chemicals from residences and pollutants from paved surfaces in close proximity to the pond and its tributary contribute to nutrient and other contaminant loading in the pond. A large year-round waterfowl population at the Mill Pond further contributes to nutrient and coliform loading, as well as sediment deposition. The freshwater system once supported a trout fishery, but now is a warm water fishery that includes largemouth bass, bluegills, and carp. The Frank Melville Memorial Foundation, which owns the park in which the Setauket Mill Pond is located, supports dredging the pond to remove accumulated silt and construction of catch basins in appropriate locations in the pond's watershed.

The Stony Brook Mill Pond and Park, which is owned by the Stony Brook Community Fund, also supports a large year-round waterfowl population. Waterfowl feeding is a major pastime at this pond, one side of which is bulkheaded and filled for a level lawn area.

The freshwater wetlands tributary to the Stony Brook Mill Pond and the Stony Brook receive discharges of stormwater drained from State Route 25A. Both the Stony Brook and Aunt Amy's Creek receive stormwater drained from Christian Avenue. The above sources contribute nutrients and contaminants to Stony Brook Harbor and West Meadow Creek.

The main tributary to Setauket Harbor collects street runoff from the heavily traveled State Route 25A in the commercial district of East Setauket. A retention basin constructed in the creek channel to treat runoff must be dredged periodically for sediment removal.

The streets of lower Port Jefferson Village are subject to inundation when storms with heavy rains coincide with high tides. The steep slopes and hilly streets of the upper village virtually become rivers of runoff because of poor soil permeability and extensive paving. The stormwater carries gravel, topsoil, fines, and contaminants into the flooded lower streets, which eventually drain into the harbor.

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Two New York State Inactive Hazardous Waste Sites are located in the groundwater contributing area of the ONCA. One is Lawrence Aviation Industries, which is in the surface watershed of the ONCA. Waste generated by the production of titanium sheet metal between 1959 and 1980 included fluorides, sludges, caustic acids, and halogenated solvents. Wastes were dumped in several areas on the site, which is in a commercial and residential area of Port Jefferson. It has been confirmed that groundwater and surface water are contaminated with trichloroethylene, tetrachloroethylene, and lead. A pond and creek down gradient from the site, in Port Jefferson Village, have been contaminated with low part-per-million levels of trichloroethylene. The degraded creek empties into Port Jefferson Harbor.

A second Inactive Hazardous Waste Site, Suffolk Materials Mining Corp., lies within the watershed of this ONCA. A public water supply well about one mile down gradient of this site has shown no contamination. Several private drinking water supply wells located down gradient have shown solvent contamination, yet the source remains undetermined. Investigation of this hazardous waste site should be completed to determine the need for remediation.

The transport of oil through the Port Jefferson portion of the ONCA by tankers servicing the LILCO power plant presents some risk of nearby oil spills.

The Stony Brook-Setauket ONCA retains large areas of vegetated tidal wetlands. These vitally important ecological communities are threatened by diminished protection of wetland buffer areas, shoreline hardening, dredging activities, and erosion by motor boat and jet ski wakes. Portions of tidal wetlands in the ONCA are dominated by the nonindigenous common reed, Phragmites australis. This species is an invasive pest, because it aggressively replaces native species of much higher wildlife value. Though difficult to control, it must be eradicated to restore wildlife habitat and other important wetland functions.

The pond at the historic Mills Pond House in St. James frequently floods its banks as it collects runoff from State Route 25A, Mills Pond Road, and nearby farmland. The pond has severe sedimentation and turbidity problems, which endanger aquatic life. The pond is one of very few freshwater resources in the ONCA's watershed and should be protected. A retention basin should be constructed near the state road for treatment of watershed runoff.

Relative to many other north shore areas, the prevailing neighborhood character of this ONCA retains a countryside appeal, which is attributable to the remaining large estates, horse farms, and agricultural land. Because of its agricultural history, the ONCA's forests generally are not old growth, native forests, but instead are secondary growth arising from former growing fields or pastures. The woods often are a mix of oaks, hickories, and black locust; however, there are extensive areas of monocultural stands of Norway maples.

The aggressive Norway maple, nearly devoid of wildlife value, has a competitive advantage in establishing itself in poor or depleted soils, and naturalizes quite freely. It has become a major pest in the Stony Brook-Setauket ONCA, robbing resident wildlife of good quality habitat by its establishment of dense, monotropic stands of trees with little or no undergrowth. Yet these stands create an illusion of lush, healthy forest. In some areas dominated by Norway maples, verticillium wilt is killing significant numbers of mature trees, opening up the canopy.

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Native forests and remnants are found in areas that were not previously farmed. Some of these areas are on droughty morainal hills, such as chestnut oak forest patches in Old Field, and mixed oak/hickory/laurel forests (approximating Appalachian oak-hickory forests) in the ONCA's watershed north of the South Setauket pine barrens. The poor soils, as well as construction constraints, such as steep slopes, may be responsible for keeping these forests intact so far. As level construction sites become more scarce, however, these forests are threatened with further fragmentation and eradication. The cumulative impacts of such losses are potentially devastating on wildlife. Groundwater and surface water quality may also be adversely affected.

In the ONCA watershed, large areas of the undeveloped land on the SUNY-Stony Brook campus have been cleared of forest and replanted with turf grass, Japanese black pine, sycamore, Norway maple, and other exotic species. Maintenance of large areas of turf grass is labor intensive and expensive and it can preclude the purity of groundwater recharge, depending on the application of fertilizers and pesticides.

The Stony Brook-Setauket ONCA watershed contains many acres of old field habitat, but most of such fields-gone-fallow are threatened with development. Some farmland development rights have been purchased in Head-of-the-Harbor by Suffolk County. Even when in public or other protective ownership, formerly farmed areas require active management to offset the eventual succession to forest, if old field wildlife species are to be sustained. Retaining habitat for old field species will be an increasing challenge in the metropolitan region.

People inhabit and play in nearly all the different geologic formations in this ONCA. Public and private erosion control projects, requiring significant expenditures, have altered coastal land-shaping processes. Within the Stony Brook-Setauket ONCA, a few areas of shoreline are hardened by structures such as sea walls, bulkheads, or revetments. Where erosion of bluffs is taking place, beaches down drift are being supplied with sand. Where seawalls or bulkheads have caused beaches to be starved of sand, efforts to relocate dwellings and other valuable structures should be considered prior to any proposal to stabilize the shoreline. In addition, it must be understood by residents that deposition of brush and other materials on bluffs is not helpful in curtailing erosion; it simply impedes the growth of stabilizing vegetation and eventually exacerbates the problem.

Docks over 100 feet long are found primarily in Conscience Bay and Setauket Harbor in this ONCA. Such docks impede navigation near shore. In addition, without adherence to strict design and construction standards, such docks may interfere with the rights of the public to move freely along the shore below the mean high water mark. A proliferation of long docks visually breaks up the coast's natural curves, lines, and expanses of color, and may contribute to fragmentation of the habitat of such species as the northern harrier, which requires open country for nesting, hunting, and winter roosting.

Navigation channels in Port Jefferson Harbor and Stony Brook Harbor have been maintained by dredging. The channel in Port Jefferson must be kept open for oil tankers delivering fuel to the LILCO plant in the harbor and for the Port Jefferson ferry service to Connecticut.

Dredging in Stony Brook Harbor has historically been the subject of much heated debate. The LWRPs applicable in this ONCA have incorporated policies addressing sediment

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transport, tidal prism, pollutant transport, and habitat protection. Decision-making standards contained in the LWRPs have been developed for any dredging in Stony Brook Harbor, which is limited to maintaining existing dredged areas.

In this ONCA, general public access to the coast is limited primarily because of residency requirements of village and town beaches and parks. Many of the publicly owned waterfront properties are accessible only by boat. This situation also makes law enforcement at these areas logistically more difficult.

Beach cottages occupy Town of Brookhaven land at West Meadow Beach. On June 24, 1994, the licensing agreement between the town and cottage owners that permitted the cottages to remain for an additional 12 years was held invalid (Johnson, Bernstein, and Mones v. Brookhaven). The court found that West Meadow Beach is dedicated parkland that cannot be alienated from public use without approval of the state legislature and the town was constrained from complying with the lease agreement.

In the Stony Brook-Setauket ONCA, boating and fishing are popular to the point of causing congestion in the waterways, posing safety problems, water quality impairments, noise disturbances, and wildlife impacts. Moorings and dockage have reached the ONCA's saturation point.

Any improved access must be controlled carefully to avoid conflicts with natural resources. Beach-nesting shorebird areas need greater protection than they are presently afforded from domestic pets, boaters, campers, and simple foot traffic, which have potentially devastating effects on eggs and chicks. Off-road vehicles are threatening survival of these endangered and threatened species at a county park.

According to the Okeanos Ocean Research Foundation, Long Island Sound's waters are used by Kemp's ridley sea turtles. More research is needed to fully understand the role Long Island Sound plays in the life cycles of sea turtles. It is becoming clear, however, that threats to sea turtles are abundant in coastal waters. Collisions with boats account for 40 percent of sea turtle deaths and injuries. Dredging disturbs feeding grounds and individuals are destroyed when sucked into hydraulic dredges. Diamondback terrapins also are at risk during dredging operations, especially when such activities occur near salt marshes. Better protection is needed for these endangered, threatened, and special concern species.

As development increases in the Stony Brook-Setauket ONCA, secondary and cumulative environmental impacts of development may reasonably be expected to increase unless a plan for restoring and maintaining ecosystem vitality is developed and implemented. The secondary impacts include nonpoint source pollution, spills of toxic and hazardous materials, solid waste generation and disposal, introductions of exotic plants and domestic pets, and increased traffic. Cumulative impacts include incremental wetland, shoreline, and forest losses resulting from filling, development of wetland adjacent areas, road and yard widening, erosion control structures, and cultural grooming of the landscape.

Criterion 3: Additional Management Measures Needed

Within the coastal area and proposed extended boundaries of this ONCA are several governmental jurisdictions: New York State, Suffolk County, the towns of Smithtown and Brookhaven, and the villages of Nissequogue, Head-of-the-Harbor, Old Field, and Poquott.

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Port Jefferson Village and the Village of Belle Terre lie just outside the ONCA and have impacts on its environmental quality. Agreement and cooperation among these levels of government, hand-in-hand with the citizens they represent, are imperative for real protection of an outstanding coastline. Research, long-term monitoring, education, open discussion, long-term comprehensive planning and intergovernmental implementation of comprehensive plans can provide the communication necessary for such cooperative ventures to be sustained.

The Town of Brookhaven needs to complete its LWRP. The LWRP would incorporate the management measures needed to protect the resources of the ONCA. The Town of Smithtown LWRP also needs to incorporate management measures developed for the ONCA. The villages of Belle Terre, Port Jefferson, and Poquott need to develop LWRPs. The Village of Old Field is preparing a LWRP.

The municipalities in the Stony Brook-Setauket ONCA need to cooperate to develop strategies for managing waterways and to develop comprehensive harbor management plans which would coordinate regulation of all uses of surface waters and underwater lands in the towns and villages, and, thus, in the ONCA.

Through comprehensive planning and management, all levels of government, as well as citizens, could cooperate within a unified framework to protect the resources of the Stony Brook-Setauket ONCA. Management plans and efforts should show recognition that people and their activities are an integral part of this natural area. Guidance, restrictions, implementation, and enforcement should be included to reduce deleterious human impacts on this coastal area and restore natural communities and processes.

Specific Actions Needed

Develop a comprehensive management plan for the Stony Brook-Setauket Outstanding Natural Coastal Area. Extend the coastal boundary to include areas shown on map.

The following specific, planning and management actions are needed:

Port Jefferson Stormwater Runoff Control: Encourage the Village of Port Jefferson to institute a comprehensive runoff control program that includes modifications to drainage infrastructure, strict construction guidelines, and landscaping requirements. In addition, encourage phasing out high maintenance landscaping in the village and replacing it with xeric and other native landscaping, as appropriate.

Beach-nesting shorebirds: Develop and implement specific plans for protection of endangered and threatened beach-nesting shorebirds to address impacts from human uses. Afford the highest possible protection of these species, as well as rare communities, in any efforts to increase public access.

Shellfish Resources: Assess shellfish resources in the ONCA and develop a customized strategy for replenishing and maintaining stocks for commercial and recreational shellfishing.

Boat Speeds: Control boat speeds and designate no-wake zones to protect salt marshes, bay bottoms, and estuarine fish and wildlife resources, and for public safety and noise abatement.

The following site-specific actions should be included in the management plan, but may be undertaken while the plan is being prepared:

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Setauket Mill Pond: Develop and implement a strategy for abating runoff in the immediate watershed of the pond to correct siltation and eutrophication of this community resource and the receiving waters of Conscience Bay. Treat stormwater runoff prior to discharge into the wetlands by providing retention area(s) at headwaters and catch basins to settle out particulates. Acquire land as necessary for construction of such treatment areas. Evaluate the pond for restoration needs. Reduce use of pond by Canada geese and ducks by planting native shrubs and other vegetation along banks. Prohibit waterfowl feeding.

Inactive Hazardous Waste Sites: Complete investigations and remediate as appropriate.

State Route 25A (in ONCA watershed): Control paving and curb cuts to reduce the need to collect runoff. Require permeable areas of natural vegetation as well as limits on roadside signs and other aesthetic insults in rights-of-way.

Head-of-the-Harbor: Evaluate large private properties adjacent to Suffolk County's development rights holdings and Nature Conservancy preserves for protection needs.

Beaches: Develop protection strategies for beach-nesting shorebirds at Long Beach, Young's Island, Crane Neck Point, the barrier spit at Flax Pond, Old Field Preserve, and McAllister County Park.

Long Beach: Require modification or removal of unpermitted or inappropriate erosion control structures.

Nissequogue Golf Club and St. George's Golf and Country Club: Promote a "gold coast" golf course aesthetic: "golden" (versus perpetually green) fairways and roughs to improve the quality of groundwater recharge and surface runoff and to protect wildlife.

Port Jefferson Sewage Treatment Plant: Upgrade as necessary.

Protect, through appropriate means, the following properties or areas:

Stony Brook Harbor: Acquire wetland buffer and upland areas adjacent to Porpoise Channel for protection of tidal wetlands, water quality, wildlife habitat, open space, and flood and erosion.

Buffer Zones, Upland Areas Adjacent to Wetlands: Acquire land necessary for implementation of wetlands restoration and stormwater runoff control, as noted below.

Restore or remediate the following areas:

Lawrence Aviation Industries: Complete the investigation of hazardous wastes. Remediate the site and contaminant plume, including creek and pond in the Village of Port Jefferson.

Suffolk Materials Mining Corp.: Complete the investigation of hazardous wastes. Remediate the site and environs as appropriate.

Stony Brook Mill Pond: Modify the existing stormwater drainage system for State Route 25A to treat road runoff prior to discharge into the wetland or pond. Encourage the Stony Brook Community Fund to plant native vegetation along the pond bulkhead to discourage Canada geese from lawn area. Prohibit waterfowl feeding.

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Aunt Amy's Creek: Modify the existing stormwater drainage system for Christian Avenue and vicinity to treat road runoff prior to discharge into the creek.

Setauket Harbor Primary Tributary Adjacent Area: Establish a naturally vegetated buffer zone adjacent to the retention basin constructed in the channel of the main tributary to Setauket Harbor. This may require partial acquisition of adjacent properties. Modify the existing stormwater collection infrastructure to provide better sediment trapping. For enhanced treatment of runoff directed to this tributary, a naturally vegetated buffer zone should be established using land that is currently used for parking and automotive repair. The stormwater collection system design should be modified for better sediment trapping prior to discharge to the creek.

Setauket Harbor, Southeastern Tributary: Evaluate for restoration needs.

Protecting the Sound's Outstanding Natural Coastal Areas

Potential measures to achieve the management objectives of the LIS CMP for the identified ONCAs are described briefly below. It is the intent of the LIS CMP to specify measures that are driven primarily by what is understood about ecological relationships in the ONCA, within the context of a place where people live, work, and play. These measures and the specific actions needed for each ONCA must be integrated in the comprehensive management plan to be developed for each ONCA in a way that resolves conflicting needs, establishes priorities, and details a coordinated and effective implementation strategy.

Measures protecting the valued resources of the ONCA, which necessarily must be creative and aggressive, must be specified in partnership with public and private interests. For sound decision-making, the long-term consequences of seemingly minor individual decisions must be understood. The LWRP for the villages of Head-of-the-Harbor and Nissequogue highlights this concern with the following statement:

> Suburbanization has approached, which means more than an increase in population, new building, and greater demands upon resources. People who have not encountered these resources before should be introduced to keeping these blessings—clean air, clean water, a wonderful range of wildlife, a rich historic heritage, much quiet and serene visual beauty—and be introduced as well to the costs attached to keeping these blessings intact. In the long run there may be no way of ensuring the preservation of these values except by arousing the interest and the affection of many.

Curtail nutrient and contaminant loads to Long Island Sound and its tributaries.

- Implement Coastal Zone Act Reauthorization Amendments of 1990.
- Implement the water quality recommendations of the Long Island Sound Comprehensive Conservation and Management Plan.
- Provide sufficient vessel waste pumpout and dump facilities to establish vessel waste no-discharge zones in all embayments.

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- Preserve country clubs and golf courses, because they provide partially natural open space; however, make significant efforts to change maintenance practices that are damaging to receiving waters and aquatic life. Promote a new coastal aesthetic for golf courses to counteract the strong desirability of high-maintenance, unnaturally green fairways.
- Retrofit direct discharges of street drainage to surface waters and wetlands to implement best management practices.
- Incorporate oil spill contingency plans for inclusion in harbor management plans.
- Remediate contaminated sites and put them to beneficial uses, such as public parks.

Protect and restore freshwater and tidal wetlands and their natural functions.

Develop a strategy that includes, but is not limited to, the following actions:

- Revise tidal wetlands regulations to permanently prohibit filling or degrading of mapped, vegetated tidal wetlands, increase protection in buffer areas, and take into account sea level rise.
- Restore tidal wetland areas dominated by Phragmites australis and remove P. australis wherever possible.
- Assess historical losses of freshwater wetlands; determine if and where restoration would be appropriate.
- Preserve freshwater wetlands through land acquisition, purchase or transfer of development rights, landowner agreements, conservation easements, restrictive covenants, and other means.
- Develop a capital or management program with priorities for acquisitions, treatment of stormwater drainage from roads prior to discharge into wetlands, and restoration of upland buffer areas.
- Use existing public properties for wetland creation, with priority given to disturbed sites. In no case should wetland creation on state land require destruction of viable natural ecological communities.
- Remind local tax assessors to take wetland restrictions into account when assessing properties for tax purposes.
- Develop a public education and environmental stewardship program for wetlands in ONCAs.

Protect and, where appropriate, expand populations of New York Natural Heritage elements (endangered, threatened, and rare species and rare natural communities).

- Develop protection and expansion strategies for populations of endangered and threatened species. Where it is appropriate to do so, develop strategies for expansion of rare natural communities and populations of rare species; where expansion of such is not appropriate, develop protection strategies.

  These strategies may include, but should not be limited to, acquisition of land, limitations to access, identification of buffer areas, landowner agreements, public education, and stewardship programs. Strategies should be developed in consultation and cooperation with the NYSDEC's endangered species program, the New York Natural Heritage Program, and The Nature Conservancy. The U.S. Fish and Wildlife

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Service should be included in planning for the Oyster Bay-Cold Spring Harbor ONCA. The strategies should ensure shared implementation by public and private parties.

Maintain sustainable populations of fish, shellfish, and wildlife species that depend on the resources of an ONCA for critical stages in their life cycles.

- Develop habitat management plans to avoid potential impacts to fish and wildlife as identified in New York State's Significant Coastal Fish and Wildlife Habitat designation narratives and in OBNWR reports.

  Habitat management plans should include, but should not be limited to, harvest limits and regulations that are based on monitoring populations of commercially and recreationally exploited species, habitat protection and expansion, and mariculture, as appropriate. They should be developed in consultation and cooperation with appropriate state, federal, and private entities.

Protect, and where possible, expand indigenous plant communities.

- Identify indigenous forest corridors for protection or restoration in the watershed. These corridors would help sustain wildlife and protect endangered, threatened, and rare plants, and also would maintain and restore buffer zones to freshwater wetlands and streams.
- Require the use of indigenous plants wherever possible in densely developed areas to provide habitat transition zones.
- Promote indigenous plantings on country clubs and golf courses to restore wildlife habitat and corridors. Indigenous plants may be especially appropriate in the roughs.
- Discourage high maintenance landscaping. Promote xeric and other indigenous landscaping.
- Restore indigenous vegetation to developed and degraded areas at every opportunity, especially on publicly owned land. Contain and eradicate nuisance exotic species. Reintroduce indigenous species. Specifically:

  - Require new landscaping on state properties to consist of high percentages of indigenous plants. Allow exceptions at established horticultural gardens; areas requiring turf grasses, where low-maintenance vegetation will be permitted; and in areas where indigenous species survival would be impaired. In the latter case, permit only those hardy species that are proven not to naturalize.
  - Target existing public holdings, such as parks, for indigenous plants upgrading. The benefits will be realized at substantially lower costs than new acquisitions of properties, which, in their current undisturbed state, already are yielding benefits. This program can seize new opportunities for value added back.
  - Utilize existing state nursery facilities and cooperate with indigenous plant nurseries within the region to undertake research on propagation and suitabilities of indigenous species for landscaping, and educational demonstration gardens to promote uses.

By these combined efforts, applications of chemical fertilizers and pesticides (and expenditures for such) may be reduced, the quality of groundwater recharge and stormwater runoff improved, natural erosion control established, and wildlife habitat restored.

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Maintain the benefits of natural shoreline functions.

- Prohibit hardening of the shoreline and other impediments to natural coastal processes in areas not needed to protect intensely developed areas and substantial public investments.
- Develop strategies for removing hardened shorelines and moving development upland and away from erosion and flood hazard areas.
- Where bluff erosion is rapid, provide incentives for moving houses atop bluffs back from the bluff face as far as is feasible. Acquire properties where this is not possible because of small lot size.
- Educate residents on the value of natural vegetation to bluffs and on activities that exacerbate bluff erosion.
- Prohibit clear-cutting of vegetation on bluffs.

Manage development in the ONCA watershed to result in cleaner surface waters, protection of estuarine life, maintenance of shellfishing, and restoration of shellfish harvesting where natural ecosystem processes may permit.

- Encourage reuse of existing developed areas and those along the shoreline for uses that are less likely to result in water quality impacts.
- Delineate areas where development can proceed with minimal negative impacts on natural resources, such as small, vacant parcels in densely settled areas of the watershed, and in sewered areas, once sewage treatment plants meet LISS nitrogen recommendations.
- Identify areas where development should be discouraged or avoided, particularly large tracts of open space, private recreation facilities, large estates and lands adjacent to the surface waters and tributaries of an ONCA, and coastal erosion hazard areas.
- Encourage protective development measures, such as transfer of development rights, cluster development, and existing use zoning for large estates and private recreation facilities.
- Ensure that development or redevelopment will be guided by the overall objectives for the ONCA within which it is situated; uses and practices having negative impacts on water quality, estuarine life, coastal access, and visual resources should be phased out and discouraged.
- Acquire appropriate properties for preservation and restoration.

Ensure that recreational activities in the ONCA will be compatible with the protection of ecological communities; endangered, threatened, and rare species; species of special concern; economically important species; and other intrinsic ecosystem elements.

- Accommodate low-impact recreational uses of the estuarine environment and discourage or prohibit those activities that threaten the survival of endangered, threatened, rare, and special concern species and other intrinsic ecosystem elements. Decisions regarding allowable uses will be based primarily on sensible protection of such elements, and perpetuating those features that provide benefits to the greatest numbers of people.

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- Preserve country clubs and golf courses, because they provide partially natural open space; however, make significant efforts to change maintenance practices that are damaging to receiving waters and aquatic life. Promote a new "coastal aesthetic" for golf courses to counteract the strong desirability of high-maintenance, unnaturally green fairways.

Prevent impairments to coastal access and develop new access opportunities that are compatible with protection of the natural resource values and uses of the ONCA.

- Prohibit long docks to prevent impairment of navigation near the shore and lateral access along the shorelines.
- Develop new access opportunities only as components of an ONCA management plan, to ensure protection of vulnerable natural resources.

Provide the public with the information necessary and the opportunity to protect the resources of the ONCA.

- Provide mechanisms for increased community involvement in deciding and planning for the area's environmental future. Aesthetics, neighborhood character, architecture, and historic and archaeological preservation may be elevated in importance by development review boards interested in maintaining the sense of place so appealing to residents and visitors. This will assure inhabitants of the ONCA that the natural area they call home will remain, in many ways, "the same, only better."
- Develop coastal stewardship opportunities for citizens interested in monitoring and protecting resources by assisting in enforcement efforts.
- Foster extensive community education and participation through which residents, planners, regulators, and other decision-makers will share a set of common goals toward restoring and maintaining a natural area reserve in which people live, work, and play.

Additional Areas for Consideration as Outstanding Natural Coastal Areas

The following additional areas exhibit characteristics that may make them suitable candidates for consideration as Outstanding Natural Coastal Areas in the Long Island Sound Coastal Management Program. Brief, general descriptions of these areas follow.

- Pelham Bay Park-Westchester County Islands
- Little Neck Bay
- Lloyd Neck-Eatons Neck
- Sunken Meadow-Nissequogue River
- Mount Sinai Harbor
- Wading River
- Wildwood-Baiting Hollow
- Riverhead Bluffs
- Eastern Islands
- Fishers Island

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Pelham Bay Park-Westchester County Islands

The Pelham Bay Park-Westchester County Islands lies in a highly urbanized area that includes parts of New York City and Westchester County and includes significant coastal parkland. It lies within the Narrows Complex, identified by the U.S. Fish and Wildlife Service as a Significant Coastal Habitat. It includes Pelham Bay Park, Glen Island County Park, David's Island, Huckleberry Island, Pea Island, Hen Island, and Shore Park in the Village of Pelham Manor. City Island and the densely developed portion of Hart Island are excluded from the ONCA. Part of the area is included in the New York City Comprehensive Waterfront Plan as a Special Natural Waterfront Area.

Pelham Bay Park comprises more than 2,700 acres of natural areas and active recreational facilities; 600 acres of the park are underwater lands. The park contains two sanctuaries and harbors more than 400 species of birds, mammals, reptiles, amphibians, fishes, and invertebrates among a diversity of natural ecological communities. It occupies an important location in the migratory flight routes of raptors, including osprey, bald eagle, northern harrier, sharp-shinned hawk, and kestrel. It contains valuable historic and archaeological resources, as well.

The area hosts large populations of wintering waterfowl, including black duck, scaup, and Canada goose. The islands off the Westchester shore, especially Huckleberry Island, provide habitat for large numbers of colonial waterbirds and support the most southerly occurrences of marine rocky intertidal communities on bedrock along the North Atlantic coastline. According to the Okeanos Ocean Research Foundation, harbor seals are known to use these areas for haulout sites.

Little Neck Bay

The Little Neck Bay area encompasses the productive waters of Little Neck Bay, Alley Pond Park, Udalls Cove Preserve and Ravine, tidal wetlands at Udalls Cove, Fort Totten, and parkland with pedestrian walkways along the western shore of the bay. It includes parts of Queens and North Hempstead. The ONCA lies within the Narrows Complex, which the U.S. Fish and Wildlife Service has identified as a Significant Coastal Habitat. It contains a state-designated significant coastal fish and wildlife habitat, and the Long Island Sound-Upper East River Special Natural Area, proposed in the New York City Comprehensive Waterfront Plan. Its salt marsh and marine subtidal communities are significant for their assemblages of native species, especially in their juxtaposition with urban development.

Lloyd Neck-Eatons Neck

The Lloyd Neck-Eatons Neck area encompasses the two necks and the coastal waters of Lloyd Harbor, Huntington Bay, Northport Bay, and Duck Island Harbor. It includes the Target Rock National Wildlife Refuge and Caumsett State Park. It lies entirely within the Town of Huntington and the Harbors Complex, which the U.S. Fish and Wildlife Service has identified as a Significant Coastal Habitat (Three Harbors Area). It contains six significant coastal fish and wildlife habitats. It supports at least three areas used by endangered beach-nesting shorebirds. The north coast of Lloyd Neck contains geologically significant bluffs, where Cretaceous sedimentary deposits are exposed. Natural ecological communities in the uplands, wetlands, marine and freshwater environments have been maintained in lightly developed areas and protected open space. The area also contains

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significant archaeological and historic resources. The waters support a significant shellfishery.

Sunken Meadow-Nissequogue River

The Sunken Meadow-Nissequogue River area encompasses the entire Nissequogue River, its headwaters, Sunken Meadow State Park, Caleb Smith State Park, Short Beach Town Park, and other adjacent county and town parkland. It lies mostly in the Town of Smithtown and the villages of Nissequogue and The Branch, although the river's headwaters lie partly in the Town of Islip. The Nissequogue River is the largest north-flowing freshwater watercourse on Long Island. The Nissequogue River has been identified by the U.S. Fish and Wildlife Service as a Significant Coastal Habitat and is a state-designated significant coastal fish and wildlife habitat. The area contains a wide variety of marine and terrestrial ecological communities, including the largest Atlantic white cedar community in western Suffolk County. Sunken Meadow State Park offers superb coastal access, as well as active and passive recreation opportunities. The first Long Island Greenbelt Trail, providing hiking access through natural areas from Long Island Sound to the Great South Bay, is located in this area. The river is a designated Scenic and Recreational River, pursuant to the state Wild, Scenic, and Recreational Rivers Act.

The area includes a preserve owned by The Nature Conservancy. The entire area is rich with archaeological and historic resources.

Mount Sinai Harbor

The Mount Sinai Harbor area encompasses Mount Sinai Harbor, Cedar Beach, Cordwood Landing County Park, a Port Jefferson village beach, state tidal wetlands, and the lightly developed, steeply sloped morainal hills and kettle holes of the harbor's immediate watershed. The area lies within the Town of Brookhaven and part of the Village of Belle Terre. The harbor and its environs are rich with ecological, historic, and archaeological resources. The waters support a regionally significant shellfishery.

Wading River

The Wading River area includes the entire Wading River Marsh and its watershed to North Country Road, from the Wading River's outlet to the Sound at the northwest to the western extent of the development south of Herod Point on the east end. It does not include the Shoreham Nuclear Power Plant site.

The Wading River Marsh is a salt marsh bordered by freshwater wetlands and forested morainal hills to the south, development to the east, the decommissioned nuclear power plant to the west, and a barrier land form and beach houses to the north. The marsh is a designated significant coastal fish and wildlife habitat, and provides habitat for endangered sea turtles as well as numerous other fish and wildlife species. According to the Okeanos Ocean Research Foundation, it is a potential breeding site for harbor seals. The marsh contains numerous Nature Conservancy preserve holdings. The area has significant archaeological and historic resources.

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Wildwood-Baiting Hollow

The Wildwood-Baiting Hollow area is entirely within the Town of Riverhead, and extends from the western boundary of Wildwood State Park to approximately Edwards Avenue at the eastern end. It includes lands south to Sound Avenue.

As one of only three New York state parks on the Long Island Sound coast, Wildwood State Park is highly valuable for public access. The park provides camping, picnicking, swimming, and cross-country skiing opportunities. The park is forested, with numerous trails and dirt roads. To the east lies a small development and Camp Baiting Hollow, presently owned by the Boy Scouts of America. Salt marsh and beach-front, held by the state for conservation purposes, lie north of the camp. The camp contains freshwater wetlands that discharge to the salt marsh and steeply sloped uplands that support a variation of oak-tulip tree forest.

In 1975, Sound Avenue was designated a scenic and historic corridor by the State Legislature "in honor and celebration of the American bicentennial and the role of Long Island in the American Revolution."

Riverhead Bluffs

The Riverhead Bluffs area is entirely within the Town of Riverhead. It extends from Warner Drive east to Pennys Road and south to approximately the midpoint between the shoreline and Sound Avenue. It includes a rare ecological community of dwarfed American beech trees, known as a maritime beech forest. It is one of only two known maritime beech forests in New York (and in size, the larger, by far), and one of three known along the east coast. It is estimated there are 20 or fewer such communities world-wide. Except where clearing or other human-induced disturbance has taken place, the maritime beech forest provides nearly complete vegetative cover to the bluffs, from the crest to the toe, along this reach of shoreline. It is not known at present whether the beech forest is a major factor in stabilizing the bluffs or is a plant community that becomes established only under relatively stable bluff conditions. The wide beach at Friar's Head supports beach grass and other vegetation at the base of the bluffs. Portions of the maritime beech forest are threatened with development.

Eastern Islands

The Eastern Islands area includes Plum Island, Plum Gut, Great Gull Island, and Little Gull Island. It lies within the Orient Point-Islands Complex, identified as a Significant Coastal Habitat by the U.S. Fish and Wildlife Service. It contains the Plum Gut Significant Coastal Fish and Wildlife Habitat. The area is entirely within the Town of Southold. The lands and waters are owned by the state and federal governments.

Plum Gut is a deep, open water channel where the waters of Gardiners Bay meet those of eastern Long Island Sound. Its significance for fisheries is described in chapter 3. Plum Island, where federal laboratories for animal disease research are located (USDA Plum Island Animal Disease Center), is restricted from public access, and excluded from the Coastal Management Program. Great Gull Island is considered by the U.S. Fish and Wildlife Service to be of national, if not international, significance, because it is colonized by over 6,000 pairs of common tern and approximately 1,200 pairs of roseate tern (federally endangered). It is the second largest breeding population of roseate tern in North America and is actively studied by the American Museum of Natural History. Both Great Gull and Little Gull islands

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are small and rocky and are dominated by grasses and other herbaceous vegetation. For a comprehensive description of the significance, threats, and conservation considerations of the Orient Point-Islands Complex, much of which is included in this area, please refer to appendix 2.

Fishers Island

The Fishers Island area includes all of Fishers Island and the turbulent open water area to its southwest known as The Race. It also includes islands north of Fishers Island: North Dumpling, South Dumpling, Flat Hammock, Pulpit Rock, West Clump, Middle Clump, East Clump, and Seal Rocks. Wicopesset Island to the east, and nearshore islands to the south also are also included. The islands north of Fishers Island are included in the Fishers Island Sound Complex Significant Coastal Habitat designated by the U.S. Fish and Wildlife Service. The Race is a significant coastal fish and wildlife habitat that is included in the Orient Point-Islands Complex.

The small islands around Fishers Island are important seal haulout areas, primarily because of their isolation from human activities. Fishers Island is a unique, rural and residential island with over 41 species of rare plants, diverse natural ecological communities, including one of two globally rare maritime beech forests in New York State, unusual geologic features, significant historic resources, and surface supplies of drinking water.

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Appendices and References

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Appendix 1

Historic and Cultural Resources

The following represents a detailed inventory of the historic resources of the Long Island Sound coastal area that have received recognition through listing on the State and national Register of Historic Places. The details of each listed historic property or district are summarized from the National Register nominations on file at the New York State Office of Parks, Recreation and Historic. Comments on the condition and accessibility of a property are based on information noted at the time of listing and may have changed. In addition, many other buildings in the coastal area have been identified by local communities as potential listings on the State and National Registers. Westchester County also has an inventory of historic places that includes State and National Register sites and other sites of historic interest, while coastal communities have identified and listed many sites of local historic and architectural significance.

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WESTCHESTER COUNTY

LISTING: Playland Amusement Park
LOCATION: Playland Parkway, City of Rye
LISTED 7/80
DATE: 1928
OWNERSHIP: Public
DESCRIPTION: 280 acre county owned amusement park featuring numerous significant buildings, amusement rides, concessions, entrance plaza, landscaped mall, swimming pool, lake and beaches. Predominant Art Deco style, with Spanish Revival Bath House. Designed by Walker and Gillette. Architecturally, historically and culturally significant as first planned amusement park in US. Parks basic plan and structures remain intact. Good/fair condition. Public access. National Historic Landmark.

LISTING: Boston Post Road Historic District
LOCATION: Boston Post Rd, City of Rye
LISTED: 10/82
DATE: Alansten-1838, Lounsberry-1831, Whitby-1854
OWNERSHIP: Public/private
DESCRIPTION: 286 acre Historic District with 25 buildings. Illustrative of 300 years of growth along the Post Road. Includes unique resources of architectural, historical, and cultural significance. 3 main structures - Alansten (the Jay House), a Greek Revival residence built for the Jay Family; Lounsberry, a Greek Revival residence; and Whitby, a Gothic Revival residence designed by AJ Davis and now the Rye Golf Club. Included in the District is the Marshlands Conservancy, part of the original Jay Estate, the Jay Family Cemetery, numerous associated buildings, and at least 10 significant loci of prehistoric activity. Most of the land in the District remains open and undeveloped, with the exteriors of the major structures largely unaltered. Condition varies from good to deteriorated. Public access.

LISTING: Larchmont Post Office
LOCATION: Chatsworth Avenue, Village of Larchmont
LISTED: 5/89
DATE: 1937
OWNERSHIP: Public
DESCRIPTION: Listed as part of thematic resources listing, "United States Post Offices in New York State, 1858-1943". Colonial Revival style, significant as intact representative example of federal architecture of Depression era. Good condition. Limited public access.

LISTING: Davenport House
LOCATION: 157 Davenport Ave, City of New Rochelle
LISTED: 5/80
DATE: 1859
OWNERSHIP: Private
DESCRIPTION: 2 story Gothic Revival cottage designed by AJ Davis. Enlarged and remodeled without detracting from original cottage design. Significant

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as a Davis design and a rare example of this style and assemblage over time. Good condition.

LISTING: Lispenard-Rodman-Davenport House
LOCATION: 180 Davenport Ave, City of New Rochelle
LISTED: 9/86
DATE: 1690
OWNERSHIP: Private
DESCRIPTION 2 story Picturesque/Colonial residence. Significant as enlargement to one of the earliest Huguenot houses in New Rochelle, historic fabric of early house remains amongst period alterations. Manifestation of two hundred year evolution of important regional house form. Significant as residence of 3 families prominent in development of New Rochelle. Good condition. Limited public access.

NEW YORK CITY: BRONX COUNTY

LISTING: Bartow-Pell Mansion and Carriage House
LOCATION: Pelham Bay Park, Shore Road, Bronx
LISTED: 10/74
DATE: 1836-42
OWNERSHIP: Public
DESCRIPTION: Traditional 5 bay, 2 story Greek Revival granite country house with granite carriage house. Featuring simple stone facade, handsome interior details, and fine garden. Significant as one of the important examples of the Greek Revival style in New York City and its environs. The property testifies to the enduring association of the Pell family with Westchester and Bronx Counties over a period of two centuries. Property was acquired in 1888 by the City of New York for future park development. In 1914 the International Garden Club leased the house; continuously utilized since then as club headquarters, the mansion has been open to the public as a house museum since 1946. The grounds are part of Pelham Bay Park. Good condition. Limited public access.

LISTING: Public School 17 (City Island Community Center and Historical Nautical Museum)
LOCATION: 190 Fordham Street, City Island, Bronx
LISTED: 8/84
DATE: 1897-8
OWNERSHIP: Public
DESCRIPTION: 2 story, 5 bay brick school in Georgian Revival style compatible to the residential scale of the neighborhood. Significant as a representative example of Georgian Revival style school architecture designed by C.B.J. Snyder. Used as a school until 1975. Building now serves as the City Island Community Center and houses the City Island Historical Nautical Museum. Deteriorated condition. Limited public access.

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LISTING: House at 175 Belden Street
LOCATION: 175 Belden Street, Bronx
LISTED: 4/82
DATE: c.1800
OWNERSHIP: Private
DESCRIPTION: 2 story picturesque cottage. Intended for rural locations, this style is seldom found in urban areas, thus this house is one of the few of its type known to exist in New York City. The house is one of the most noteworthy structures on City Island and is a special part of New York City's architectural heritage. Good condition. No public access.

LISTING: Fort Schuyler (State University of New York Maritime College)
LOCATION: Fort Schuyler, Bronx
LISTED: 5/86
DATE: 1833-56
OWNERSHIP: Private
DESCRIPTION: Fort Schuyler is located at the junction of the East River and the Long Island Sound on Throgs Neck, an area which was militarily significant for the defense of New York City. The fort, typical of 19th century coastal fortifications, is built of grey granite in the shape of an irregular pentagon. The fort has retained its exterior and basic structural integrity. It is surrounded by a complex of 19th century officers housing and warehouses. The site constitutes a significant complex illustrative of the 19th century military coastal fortifications which protected New York City and the gateway to the interior of New York State. Restored in 1934-8 as part of the campus of the New York State Maritime College, it is a successful example of adaptive reuse. Excellent condition. Limited public access.

NEW YORK CITY: QUEENS COUNTY

LISTING: Fort Totten Officers' Club
LOCATION: Corner of Totten and Murray Avenues, Fort Totten, Queens
LISTED: 2/84
DATE: 1870, 1887
OWNERSHIP: Public
DESCRIPTION: 2 story frame castellated Gothic Revival style building with a projecting central tower pavilion, principal elevation terminates with identical 3 story towers at each end. Sheathed in clapboard, finished with wood detailing. Interior configuration altered over the life of structure, but portions of original paneling, moldings and decorative plaster remain. A distinctive visual landmark in its garrison setting. Historically and architecturally significant as an unusual and intact example of late Gothic Revival style institutional architecture associated with the garrison life of a New York Harbor defense installation. Assumes additional architectural significance as a rare wood frame interpretation of the style. Fair condition. Limited public access.

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LISTING: Cornelius Van Wyck House
LOCATION: 126 West Drive, Douglaston, Queens
LISTED: 9/83
DATE: 1735, 1750-70
OWNERSHIP: Private
DESCRIPTION: 2.5 story wood frame Dutch Colonial farmhouse on its original site. Original parts of house built c.1735 to the "one room plan" of the early settlers of the New York area, enlarged between 1750-70 to its present form. Building covered with long hand-hewn shingles which have rounded or notched butts. Decorative features in Georgian style on main elevation. Exposed ceiling beams, early staircase, Georgian mantlepieces, full panelled wall and a classic box cornice decorate the interior. Architecturally significant as a rare surviving example of an early Dutch Colonial farmhouse characteristic of Dutch Colonial architecture on Long Island. Historically significant for its associations with the Van Wyck family, one of the early Dutch family to settled in Queens in the seventeenth century, and a family linked with the revolutionary period of American history. Excellent condition. Limited public access.

LISTING: Allen-Beville House
LOCATION: 29 Center Drive, Douglaston, Queens
LISTED: 8/83
DATE: 148-50
OWNERSHIP: Private
DESCRIPTION: Symmetrical 2.5 story white clapboard Italianate farmhouse. Decorative exterior includes full-height windows, bracketed cornice and porches, fluted Doric columns, ornamental entablature, and Queen Anne doors. A bracketed cupola crowns the house and is one of its most striking features. Formal Italianate interior with surviving original details. Architecturally significant as a rare surviving example of an Italianate farmhouse built in New York City in the 19th century. Became part of the William P. Douglas Estate. In 1905-6 the Douglas Manor Development Company bought the 180 acre Douglas Estate and subdivided the land as a real estate development. The area became an attractive middle-class suburb, which included the Allen-Beville house. Douglas Manor is itself an active National Register District proposal, covering almost the entire peninsula of Douglaston, north from Parsons Beach. Excellent condition. Limited public access.

NASSAU COUNTY

LISTING: Saddle Rock Grist Mill
LOCATION: Grist Mill Lane, Saddle Rock
LISTED: 12/78
DATE: 1715
OWNERSHIP: Public
DESCRIPTION: 2.5 story timber-framed, shingled grist mill with gambrel roof. Site features tidal and stream-fed mill pond and sloop landing. An important

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example of this rare technology, the Saddle Rock Grist Mill is the only operating tidal grist mill on the east coast. Long Island Wind and Tide Mills Thematic Resources. Good condition. Museum. Limited public access.

LISTING: John Philip Sousa House (Wildbank)
LOCATION: 14 Hicks Lane, Sands Point
LISTED: National Historic Landmark, 5/66
DATE: 1907
OWNERSHIP: Private
DESCRIPTION: 2.5 story eclectic stuccoed brick residence. Home of John Philip Sousa, conductor, composer of United States Marine Corps Band.

LISTING: Sands Family Cemetery
LOCATION: Sands Point Road, Sands Point
LISTED: 3/92
DATE: 1704-1867
OWNERSHIP: Private
DESCRIPTION: 1 acre Sands family cemetery. Records indicate that 112 members of the family, relatives and friends are buried in the cemetery. The Sands Family Cemetery is historically and architecturally significant for its association with the early settlement and growth of the sands Point area, its distinguished collection of well preserved gravestones and its information on early settlers.

LISTING: Roslyn Village Historic District
LOCATION: Central historic core of Village of Roslyn
LISTED: 4/87
DATE: Various
OWNERSHIP: Various
DESCRIPTION: The 65 acre Roslyn Village Historic District consists of 81 contributing buildings in the central historic core of the Village. It contains a representative sampling of building types, architectural styles and land use patterns associated with the Roslyn's historic development between c.1680 and 1930. Most buildings are 19th century residential and commercial structures including numerous Federal and Greek Revival frame buildings. Incorporates the Main Street Historic District. Notable properties include Georgian Revival Bryant Library and Roslyn Presbyterian Church. The Roslyn Village Historic District is historically and architecturally significant as an intact and cohesive enclave of historic buildings, landscapes, and streetscapes which illustrate Roslyn's growth and development. The district has retained much of it's historic character and scale, in spite of intense development pressure. Roslyn Village Multiple Resources Area.

LISTING: Main Street Historic District
LOCATION: Main Street, Roslyn
LISTED: 1/74
DATE: Various
OWNERSHIP: Various

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DESCRIPTION: Primarily a residential neighborhood with a cluster of commercial buildings, the Historic District includes 50 contributing buildings. These are mostly 19th century frame vernacular structures. Notable buildings include the Ellen E. Ward Memorial Clock Tower, Obadiah Washington Valentine House, Warren Wilkey House, and Van Norstrand-Starkins House. Architecturally significant as an essentially uncompromised cluster of vernacular 19th century residential and commercial structures in a Village context and an illustration of the architectural development of the Village of Roslyn. Incorporated within the Roslyn Village Historic District, although it retains its separate identity as an intact and visually cohesive neighborhood. Roslyn Village Multiple Resource Area.

LISTING: Hicks Lumber Co. Store
LOCATION: 1345 Old Northern Boulevard, Roslyn
LISTED: 10/86
DATE: 1920
OWNERSHIP: Private
DESCRIPTION: 2 story Colonial Revival frame commercial building with 2 story portico. It is architecturally significant as an unusual example of Colonial Revival commercial architecture in Roslyn. Roslyn Village Multiple Resource Area. Good condition. Limited public access.

LISTING: Roslyn Grist Mill
LOCATION: 1347 Old Northern Boulevard, Roslyn
LISTED: 10/86
DATE: 1715-41
OWNERSHIP: Public
DESCRIPTION: 2.5 story Colonial frame grist mill features intact timber framework and survival of original gearing and milling equipment. It is historically and architecturally significant as the only surviving building representative of Roslyn's 18th and 19th century water power industries and as a rare and intact example of 18th century milling technology and construction practices. Altered for use as a museum and tea house in 1916. Roslyn Village Multiple Resource Area. Good condition. Limited public access.

LISTING: Roslyn Savings Bank Building
LOCATION: 1400 Old Northern Boulevard, Roslyn
LISTED: 10/86
DATE: 1932
OWNERSHIP: Private
DESCRIPTION: 2 story brick Georgian Revival bank. Retains original columned banking hall. It is architecturally significant as one of the Villages most sophisticated and authentic examples of Georgian Revival style design. Roslyn Village Multiple Resource Area. Good condition. Limited public access.

LISTING: Willet Titus House
LOCATION: 1441 Old Northern Boulevard, Roslyn
LISTED: 10/86
DATE: c1860

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OWNERSHIP: Private
DESCRIPTION: 2 story Italianate frame residence. Architecturally significant as an intact representative example of Italianate style domestic architecture in Roslyn. Roslyn Village Multiple Resource Area. Good condition. Limited public access.

LISTING: Cedarmere-Clayton Estates
LOCATION: Bryant Avenue and Northern Boulevard, Roslyn Harbor
LISTED: 2/86
DATE: 1840's, 1930's
OWNERSHIP: Public
DESCRIPTION: Two contiguous estates located on the east side of Hempstead Harbor. The 7 acre Cedarmere Estate of William Cullen Bryant is located within the Coastal Area. Cedarmere features a large rambling 2.5 story main residence and associated estate structures, including a Gothic Revival mill. The main house is an 18th century farmhouse enlarged in Colonial Revival style. Estate features picturesque waterfront landscape designed by Frederick Law Olmstead. The estates are architecturally and historically significant estates in Roslyn harbor. They contain a variety of styles of buildings and landscapes and are associated with three important families. Good/deteriorated condition. Limited public access.

LISTING: Sea Cliff Summer Resort Thematic Group
LOCATION: Sea Cliff
LISTED: 2/88
DATE: 1864-95
OWNERSHIP: Various
DESCRIPTION: The Sea Cliff Summer Resort Thematic Resources includes 27 individual component properties which are historically and architecturally significant for illustrating the village's rapid development as a popular summer resort during the late 19th century and are distinguished examples of seasonal homes for middle-income Americans. The properties display popular late 19th century architectural styles, including Gothic revival, Stick style,Queen Anne, Shingle style and Second Empire, all featuring distinctive picturesque design and detail in contrast to the vernacular tradition of Long Island. These properties display a high level of architectural integrity and represent one of the best collections of late Victorian era architecture in Nassau County. The following individual properties are situated within the coastal area:

Residence at 290 Eighth Avenue
Residence at 362 Sea Cliff Avenue
Residence at 176 Prospect Avenue
Residence at 137 Prospect Avenue
Residence at 162 Sixteenth Street
Residence at 173 Sixteenth Street
Residence at 195 Prospect Avenue
Residence at 199 Prospect Avenue
Residence at 52 Eighteenth Avenue
Residence at 58 Eighteenth Avenue

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Residence at 65 Twentieth Avenue
Residence at 378 Glen Avenue
Residence at 332 Franklin Avenue
Residence at 9 Locust Place
Residence at 19 Locust Place
The Crowell residence, 375 Littleworth Lane

LISTING: The Shell House
LOCATION: 26 Westland Drive, East Island, Glen Cove
LISTED: 6/88
DATE: 1850-75, 1910
OWNERSHIP: Private
DESCRIPTION: The Shell House is comprised of a small Norman style core (1850-75), altered in 1910 into a Tudor Revival style residential dependency of the J.P. Morgan, Jr. Matinecock Point Estate. The Shell House is the sole surviving element of this once prosperous estate. The house retains a high degree of architectural integrity and has architectural significance as a distinctive example of a residential dependency associated with Long Island's Gold Coast era of estate development. Good condition. Limited public access.

LISTING: John E. Aldred Estate (Ormston)
LOCATION: Lattingtown Road, Lattingtown
LISTED: 8/79
DATE: 1916
OWNERSHIP: Private
DESCRIPTION: A 117 acre estate fronting Long Island Sound featuring a large Tudor Revival limestone residence designed by Bertram G. Goodhue. It is situated within formal gardens and landscaping designed by the Olmstead Brothers. The property includes two main clusters of estate dependencies. The property is significant as one of the few major estates to survive intact from the Gold Coast era. Currently owned by the Order of St. Basil the Great. Excellent condition. Limited public access.

LISTING: Seawanhaka Corinthian Yacht Club
LOCATION: Centre Island Road, Oyster Bay
LISTED: 1/74
DATE: 1891-2
OWNERSHIP: Private
DESCRIPTION: 12 acre property fronting Oyster Bay harbor featuring a large Colonial revival frame clubhouse designed by Robert W. Gibson. Many exterior and interior details. Architectural character unimpaired despite continuous use as headquarters of a well known small boat sailing facility, one of the oldest amateur yacht clubs in the United States. Excellent condition. Limited public access.

LISTING: James William Beekman Estate (The Cliffs)
LOCATION: West Shore Road, Oyster Bay
LISTED: 12/73
DATE: 1863-64

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OWNERSHIP: Private
DESCRIPTION: 37 acre estate overlooking Oyster Bay, featuring a large Gothic Revival residence designed by Henry G. Harrison for James William Beekman, the politician and civic leader. Detailed interior features. Estate also features the Spring Lake archeological site, a possible village site. The Beekman Estate has archeological, historical and architectural significance. It is particularly significant for the intact and undisturbed nature of the site. Excellent condition. Limited public access.

LISTING: Oyster Bay Post Office
LOCATION: Shore Avenue, Oyster Bay
LISTED: 5/89
DATE: 1935-6, 1936-7
OWNERSHIP: Public
DESCRIPTION: 2 story brick Georgian Revival post office designed by Bottomley, Wagner and White. Significant interior detailing, including mural and sculpture series by Abell Sturges, Ernest Peixotto, and Leo Lentelli. Architecturally significant as an outstanding example of public architecture during the Great Depression and for its sophisticated design. Artistically significant for interior mural and sculpture collection. Listed as part of United States Post Offices in New York State, 1858-1943, Thematic Resources. Good condition. Limited public access.

LISTING: Raynham Hall
LOCATION: 20 West Main Street, Oyster Bay
LISTED: 6/74
DATE: c. 1738
OWNERSHIP: Public
DESCRIPTION: 2.5 story Colonial frame residence dating from 1738, modified in the mid-19th century and restored in the 1950's. Significant as illustration of domestic vernacular design common to Long Island in 18/19th century. Historical significance from association with the locally prominent Townsend family. Excellent condition. Museum. Limited public access.

LISTING: Edward H. Swan House
LOCATION: Cove Neck Road, Oyster Bay
LISTED: 5/76
DATE: 1853
OWNERSHIP: Private
DESCRIPTION: Substantial 2.5 story residence built as country seat for a wealthy New York City merchant. Architecturally significant as one of the finest Second Empire style residences to be erected on Long Island. Remains as a landmark to Cove Neck's identity as a country retreat for the wealthy. Excellent condition. No public access.

LISTING: James Alfred Roosevelt Estate (Yellowbanks)
LOCATION: 360 Cove Neck Road, Cove Neck Village
LISTED: 5/79
DATE: 1881

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OWNERSHIP: Private
DESCRIPTION: 2.5/3 story Shingle Style house located on a 12 acre estate overlooking Oyster Bay Harbor. Modified over the years from its early beginnings as a summer house. The property has architectural significance as one of the major accomplishments of Bruce Price's Shingle Style and historical significance for its association with the Roosevelt family and links with the neighboring Sagamore Estate. Excellent condition. No public access.

LISTING: Sagamore Hill National Historic Site
LOCATION: Cove Neck Road, Cove Neck Village
LISTED: 7/62
DATE: 1884-5
OWNERSHIP: Public
DESCRIPTION: 83 acre estate on Cold Spring Harbor featuring large rambling Queen Anne frame residence designed by Lamb and Rich and landscaped grounds. Built for Theodore Roosevelt, his home until his death. National Historic Site.

SUFFOLK COUNTY

LISTING: Huntington Town Multiple Resource Area
LOCATION: Various sites and districts, Town of Huntington
DESCRIPTION: The historic resources of the Town of Huntington were identified through a comprehensive historical/architectural survey undertaken in 1979 by the Huntington Community Development Office in conjunction with OPRHP. The multiple resource area nomination includes 76 individual listings and 10 historic districts. A wide range of building types, architectural styles and periods of construction are represented in the multiple resource area. The properties reflect Huntington's growth and development, representative of early settlement period architecture through to the rapid estate growth of the "Gold Coast" era. This reflects the historical development of the Town from its early agrarian culture to its later prominence as a summer resort and its development into a suburban community. The properties and districts within the coastal area are summarized below.

LISTING: Harbor Road Historic District
LOCATION: Harbor Road, Cold Spring Harbor
LISTED: 9/85
DATE: 1791-1869
OWNERSHIP: Various
DESCRIPTION: 45 acre residential district containing 18 contributing buildings that represent Cold Spring Harbor's earliest settlement. The earliest historic component is the site of the Hewlett-Jones Grist Mill, built in 1791 and destroyed by fire in 1921. The majority of dwellings date from the early 19th century and are representative of the town's settlement period architecture, distinguished by restrained Federal and Greek Revival style

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details. Many of the dwellings received alterations as a result of Cold Spring Harbor's sudden popularity as an affluent summer resort in the late 19th century and again around the turn of the century with the evolution into a year-round residential community. The District is architecturally and historically significant for its association with the original settlement and residential development of Cold Spring Harbor and for the intact collection of various period residences. It is also significant for its associations with the locally prominent Jones and Hewlett families. Huntington Town Multiple Resource Area.

LISTING: Shore Road Historic District
LOCATION: Shore Road vicinity, Cold Spring Harbor
LISTED: 9/85
DATE: c1790-1900
OWNERSHIP: Various
DESCRIPTION: 36 acre residential enclave containing 18 contributing buildings. 7 of the dwellings are representative of local settlement period architecture, although many received period alterations and additions as Cold Spring Harbor developed into a summer resort and later into a year round community. The oldest component is the Henry Titus Farmstead, built c1790, the dwelling and related outbuildings form a relatively intact farm complex. Wawapek is a fine example of 20th century estate architecture and is reminiscent of an Adirondack lodge. The District is architecturally and historically significant as a relatively intact collection of residences that illustrate the architectural practices and patterns of growth in Cold Spring Harbor. It contains several fine examples of settlement period architecture and a significant turn of the century estate. Huntington Town Multiple Resource Area.

LISTING: Main Street Historic District
LOCATION: Main Street, Cold Spring Harbor
LISTED: 9/85
DATE: c1830-c1910
OWNERSHIP: Various
DESCRIPTION: 8 acre primarily residential neighborhood consisting of 31 contributing buildings, constituting the largely intact historic core of the Village. They illustrate the Villages development from a major whaling port through its popularity as a fashionable summer resort to its emergence as an affluent suburb at the turn of the century. The District includes representative examples of early 19th century settlement period architecture, two early religious properties and later spacious Victorian dwellings. The District is architecturally and historically significant as the intact historic Village core of Cold Spring Harbor, with its intact collection of buildings illustrating the communities development. The buildings depict the many changing architectural styles, including the unique collection of highly decorative late 19th century dwellings known as "Ship Captains Row". The District retains its historic appearance as a late 19th century village with its intact streetscape and well-maintained, tree lined landscape rare in this highly developed area. Huntington Town Multiple Resource Area.

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LISTING: Cold Spring Harbor Library
LOCATION: 1 Shore Road, Cold Spring Harbor
LISTED: 9/85
DATE: 1913
OWNERSHIP: Private
DESCRIPTION: 1 story, 5 bay Neoclassical brick building designed by Julian Peabody. It is architecturally significant as the most distinguished early 20th century civic building in Cold Spring Harbor and it is a locally significant example of the Neoclassical style. The construction of the library recalls the transformation from a seasonal summer resort to an established year round residential community. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Titus-Bunce House
LOCATION: 7 Goose Hill Road, Cold Spring Harbor
LISTED: 9/85
DATE: c1820
OWNERSHIP: Private
DESCRIPTION: 2 story Greek Revival clapboard residence with elaborate exterior detailing, including mid 19th century Italianate detailing. The dwelling retains its architectural integrity and historic rural setting. It is architecturally and historically significant as a distinguished example of early 19th century residential architecture in the Village of Cold Spring Harbor and for its association with the Village's historic agricultural development along Goose Hill Road. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Goose Hill Road Historic District
LOCATION: Goose Hill Road vicinity, Cold Spring Harbor
LISTED: 9/85
DATE: c1770-c1850
OWNERSHIP: Various
DESCRIPTION: 20 acre agrarian enclave containing 12 contributing buildings that reflect the early agricultural development of Cold Spring Harbor. The buildings are located on large wooded lots in a relatively undeveloped area. The majority of the buildings date from the Village's initial development and are representative examples of Long Island' settlement period architecture. For most part these properties remain virtually unaltered, distanced from the core of the community the area was relatively unaffected by the prosperous growth of the estate era. The most distinctive example of settlement period architecture is the Kehillath Shalom House. The District is architecturally and historically significant for its largely intact collection of residences set in an undeveloped landscape which recall the historic agricultural development of Cold Spring Harbor. Huntington Town Multiple Resource Area.

LISTING: Joseph Lloyd Manor House
LOCATION: Lloyd Harbor Road
LISTED: 11/76
DATE: c1766-7

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OWNERSHIP: Private
DESCRIPTION: 2.5 story frame Colonial shingled dwelling overlooking Lloyd Harbor. Built as the second manor house of the Manor of Queen's Village for Joseph Lloyd. Despite numerous alterations and additions, the house remains in a remarkable state of preservation, retaining many of its decorative elements. Notable interior woodwork. The house is significant as the seat of a large and prosperous country estate associated with the prominent Lloyd family, early settlers of the area. Operated as a museum by the Society for the Preservation of Long Island Antiquities. Good condition. Limited public access.

LISTING: Fort Hill Estate
LOCATION: Fort Hill Drive, Lloyd Harbor
LISTED: 6/88
DATE: 1879, 1900, 1911
OWNERSHIP: Private
DESCRIPTION: 23 acre estate on Cold Spring Harbor featuring a dramatically situated monumental brick and limestone Tudor Revival mansion. Designed in 1900 by Boring and Tilton for William John Matheson, the house incorporates an earlier building designed by McKim, Mead and Bigelow. Much exterior and internal detailing. Property includes outbuildings, water tower and formal gardens. Property includes site of Fort Franklin, a British Revolutionary War fort. Fort Hill is one of the most architecturally and historically significant late 19th century estates on Long Island and is an intact example of the development of a Gold Coast era estate. Excellent condition. Limited public access.

LISTING: Marshall Field III Estate (Caumsett State Park)
LOCATION: Lloyd Harbor Road, Lloyd Harbor
LISTED: 4/79
DATE: 1711, 1923-25
OWNERSHIP: Public
DESCRIPTION: Extensive 1400 acre estate property located between Long Island Sound and Lloyd Harbor. The largely intact former Marshall Field III estate consists of many notable buildings, open fields, farm complex, picturesque roadways, wooded landscapes and a varied shoreline. Completed in 1925, the estates diverse landscape, main house and numerous dependencies were designed by John Russell Pope. The estate features a two story limestone Georgian Revival residence with elaborate detailing and the Henry Lloyd House (1711). The property now forms Caumsett State Park. The property is architecturally, historically and culturally significant. Within the park boundaries is evidence of prehistoric civilization, architectural statements about successive periods of growth and development in northern Long Island and an environment which includes nearly every kind of natural feature indigenous to this part of New York. Good/fair condition. Limited public access.

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LISTING: Lloyd Harbor Lighthouse
LOCATION: Entrance to Lloyd Harbor
LISTED: 5/89
DATE: 1912
OWNERSHIP: Public
DESCRIPTION: 2 story reinforced concrete lighthouse with octagonal lantern and attached keepers dwelling. Interior retains much of original structural and finish materials. It is significant as one of the earliest reinforced concrete lighthouses in the nation and because it represents the maritime heritage of the north shore.

LISTING: Van Wyck-Lefferts Tide Mill
LOCATION: Lloyd Harbor
LISTED: 6/78
DATE: 1793-97
OWNERSHIP: Private
DESCRIPTION: 3.5 story frame tide mill with original machinery. Best extant example of a tide mill with its original machinery surviving on Long Island. Long Island Wind and Tide Mills Thematic Resources. Fair condition. Limited public access.

LISTING: George McKeeson Brown Estate (Coindre Hill)
LOCATION: Brown's Road, Lloyd Harbor
LISTED: 9/85
DATE: 1910
OWNERSHIP: Public
DESCRIPTION: The former George McKeeson Brown Estate occupies 13 acres, part of a larger estate that has been reduced as a result of subdivision. Although reduced in size, the estates main house and nearby dependencies have retained an appropriate historic setting. The large, rambling 2.5 story stucco-clad structure, designed by Clarence Luce, is distinguished by a massive red clay tile hipped roof, prominent circular roofs, and steeply pointed masonry gables. Elaborate exterior and interior features and detailing. The property is architecturally significant as one of the most distinguished early 20th century estates in the Town of Huntington. A distinctive example of the French Chateauesque style, the estate is representative of those built on Long Island's "Gold Coast". Although parts of the main house has been altered nd the estate reduced in size the estate retains much of its integrity. Converted into a school in 1940. Huntington Town Multiple Resource Area. Good condition

LISTING: Gilsey Mansion
LOCATION: 36 Browns Road, Huntington
LISTED: 9/85
DATE: 1900
OWNERSHIP: Private
DESCRIPTION: 2 story Colonial revival residence. It is architecturally significant as an outstanding example of a Colonial Revival style mansion. Representative of early 20th century upper income residential architecture in the Town of Huntington, the Gilsey Mansion exhibits the primary design

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characteristics of the Colonial revival style. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: William Wooden Wood House
LOCATION: 90 Preston Street, Huntington
LISTED: 9/85
DATE: 1868-9
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard residence. It is architecturally significant as one of the finest local interpretations of the picturesque style of architecture within the Town of Huntington. The imposing size and sophisticated detailing distinguish this residence from other period dwellings in Huntington. The architectural importance is enhanced by its intact, stylish period interior. The dwelling is historically significant for its association with the locally prominent Wood family. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Daniel Smith House
LOCATION: 117 West Shore Road, Huntington
LISTED: 9/85
DATE: 1830, 1855
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard residence. It is architecturally significant as an intact, representative example of late settlement period architecture in the Town of Huntington. The property reflects the common building practice of adding a larger, more stylish residence to a smaller dwelling, which is incorporated as a wing.The original dwelling is an example of the local vernacular, while the addition is in the Greek Revival style. Huntington Town Multiple Resource Area. Excellent condition. Limited public access

LISTING: Henry Williams House
LOCATION: 43 Mill Lane, Huntington
LISTED: 9/85
DATE: c1850
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard residence. It is an architecturally distinctive mid-19th century residence which exhibits numerous characteristics of settlement period architecture in the Town of Huntington. The property is particularly significant as a combination of both settlement period architecture details and detailing that reflects the late 19th century American picturesque taste in the town's architecture. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: East Shore Road Historic District
LOCATION: East Shore Road, Halesite
LISTED: 9/85
DATE: c1800-c1925
OWNERSHIP: Various

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DESCRIPTION: 12 acre Historic District containing 21 contributing elements that comprise a small residential enclave located on the east bank of Huntington Harbor. The historic properties reflect a progression of the area's changing local building practices and patterns of growth. The majority of the residences date from 1860 to 1900 and also includes 3 settlement period dwellings and the site of a mid-18th century pottery works that reflects the neighborhoods original settlement. The District is architecturally and historically significant as one of the few surviving collections of largely intact working class residences in the Town of Huntington, exhibiting the characteristic small scale and the modest detailing and later picturesque, eclectic architectural details popular during the late 19th century in contrast to the surrounding estates of the rich and middle class. Huntington Town Multiple Resource Area.

LISTING: John Green House
LOCATION: 167 East Shore Road, Huntington Bay
LISTED: 9/85
DATE: c1900
OWNERSHIP: Private
DESCRIPTION: 2.5 story rambling Colonial Revival shingled residence located in an intact estate setting. It is architecturally significant as a relatively unaltered and representative example of the larger upper income single family residences built in the Village of Huntington Bay at the turn of the century. It is a distinctive example of the Colonial Revival style. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Bowes House
LOCATION: 15 Harbor Hill Drive, Huntington Bay
LISTED: 9/85
DATE: 1899
OWNERSHIP: Private
DESCRIPTION: 2.5 story Shingle style residence. It is architecturally significant as an intact representative example of the larger upper income single family residences built along Huntington's north shore during its rapid turn of the century development. It is also architecturally significant as one of the most distinguished examples of the Shingle style of architecture in the resource area. Huntington Town Multiple Resource Area. Excellent condition. limited public access.

LISTING: C.A. O'Donohue House
LOCATION: 158 Shore Road
LISTED: 9/85
DATE: 1917
OWNERSHIP: Private
DESCRIPTION: 2.5 story shingled Colonial Revival residence. It is architecturally significant as a distinguished example of the early residential architecture in the Village of Huntington bay and an intact representative example of the large, stylish homes built throughout Huntington's north shore at the

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turn of the century. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Charles Geoghegan House
LOCATION: 9 Harbor Hill Drive, Huntington Bay
LISTED: 9/85
DATE: c1915
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard and shingled sheathed residence exhibiting an eclectic mix of Queen Anne and Shingle style architectural features. It is architecturally significant as an intact representative example of the larger upper income single family residences built along Huntington's north shore during its rapid turn of the century development. Huntington Town Multiple Resource Area. Good condition. Limited public access.

LISTING: John P. Kane Mansion
LOCATION: 37 Kanes Lane,Huntington Bay
LISTED: 9/85
DATE: c1850
OWNERSHIP: Private
DESCRIPTION: 3 story Italianate clapboard mansion set within the traditional Georgian massing. Once part of a large estate, now lost to subdivision, the lot retains its semi-rural ambience. The property is historically significant as the oldest extant dwelling in Huntington Bay. Huntington Town Multiple Resource Area. Good condition. Limited public access.

LISTING: House at 200 Bay Avenue
LOCATION: 200 Bay Avenue, Huntington Bay
LISTED: 9/85
DATE: 1890
OWNERSHIP: Private
DESCRIPTION: 2.5 story rambling Tudor-Revival residence. The residence retains its historic picturesque setting and architectural integrity. It is architecturally significant as a representative example of the large, upper income, single family houses built in the Village of Huntington Bay during its rapid turn-of-the-century development and is a well crafted example of the Tudor-Revival style. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Bay Crest Historic District
LOCATION: Bay Avenue vicinity, Huntington Bay
LISTED: 9/85
DATE: c1890-1905
OWNERSHIP: Various
DESCRIPTION: 16 acre residential enclave containing 12 residences and 9 contributing outbuildings in intact estate-like settings. The residences exhibit a variety of picturesque styles popular during the Victorian era. The entrance to the district is marked by two granite monoliths marked "Bay Crest" and the enclave is clearly delineated as a result of surrounding modern development. The district is marked by a uniformity of period design

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and scale and laid out on generous landscaped lots off private drives. Planned as a summer house enclave, the dwellings share a combination of typical architectural features. The District is architecturally significant as one of two surviving examples of a planned residential enclave, a distinguished example of late Victorian period residential architecture that illustrates the growth and development of Huntington's north shore as an exclusive residential community. The spacious residences are architecturally significant for their generous massing, superior craftsmanship and stylish late 19th century detailing. Huntington Town Multiple Resource Area.

LISTING: J.T. Robb House (#1)
LOCATION: Sydney Road, Huntington Bay
LISTED: 9/85
DATE: 1887
OWNERSHIP: Private
DESCRIPTION: 2.5 story rambling Eclectic style clapboard residence. It is architecturally significant as an intact representative example of the larger upper income single family residences built along Huntington's north shore during its rapid turn of the century development. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: J.T. Robb House (#2)
LOCATION: 23 Sydney Road, Huntington Bay
LISTED: 9/85
DATE: 1887
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard and shingled residence designed in an eclectic mix of Shingle and Colonial Revival styles. It is architecturally significant as a distinguished example of the early residential architecture in the Village of Huntington bay and an intact representative example of the large, stylish homes built throughout Huntington's north shore at the turn of the century. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: A.P.W. Kennan House
LOCATION: Sydney Road, Huntington Bay
LISTED: 9/85
DATE: c1900
OWNERSHIP: Private
DESCRIPTION: 2.5 story rambling Colonial Revival residence. It is architecturally significant as a distinguished example of the early residential architecture in the Village of Huntington bay and an intact representative example of the large, stylish homes built throughout Huntington's north shore at the turn of the century. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

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LISTING: Beaux Arts Park Historic District
LOCATION: Upper and Lower Drives, Huntington Bay
LISTED: 9/85
DATE: c1905-1915
OWNERSHIP: Various
DESCRIPTION: 3 acre residential enclave including 5 large stucco residences and associated buildings set on generous landscaped lots. The decorative Tudor Revival and Spanish Colonial Revival style dwellings represent a dramatic departure from Huntington's pervasive conservative local building tradition. The District is architecturally and historically significant as a small planned residential community, part of a large development that never was completed, and for its architectural styles. It reflected the development of Huntington's north shore as an exclusive residential community at the turn of the century and represents one of the last phases of the architectural and residential development of the area. Huntington Town Multiple Resource Area.

LISTING: William K. Vanderbilt Estate (Eagles Nest)
LOCATION: Little Neck Road, Little Neck
LISTED: 9/85
DATE: 1907-36
OWNERSHIP: Public
DESCRIPTION: 43 acre landscaped estate featuring 10 contributing buildings, arboretums, formal gardens, reflecting ponds and a marble sanctuary. The entrance to the property is marked by large decorative wrought iron gates which have massive black eagles perched on top. Beyond and east of the gates are six marble Byzantine columns taken from the ruins at Carthage arranged in a semi-circle. The centerpiece of the estate is the mansion, a large Spanish Baroque style residence begun in 1907 and extensively enlarged over the early 20th century. Built for William K. Vanderbilt, Jr, the president of the New York City Railroad and major philanthropist and civic leader, by the renowned architecture firm of Warren and Wetmore. The 3 story stucco building is dominated by a four story tiered bell tower. Elaborate exterior and interior features and detailing. Other contributing elements include the Vanderbilt Marine museum, the former garage/servants quarters, the boat house, the airplane hanger, the powerhouse and garage complex, and the caretakers cottage. The estate is now a museum of marine life and natural history. The estate is architecturally significant as one of the most intact early 20th century estates representative of those built on Long Island's celebrated "Gold Coast", a period that denotes the transformation of the north shore and saw the development of many large estates and country homes built by wealthy businessmen and industrialists. Huntington Town Multiple Resource Area. Good condition. Limited public access.

LISTING: Charles Van Iderstine Mansion
LOCATION: Idle Day Drive, Little Neck
LISTED: 9/85
DATE: 1897
OWNERSHIP: Private

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DESCRIPTION: Large, rambling 2.5 story clapboard, shingled and shiplap-sided residence. Originally part of an estate, now lost to subdivision, the residence remains virtually unaltered. It is architecturally significant as an outstanding example of the large mansions built on Huntington's north shore at the turn of the century that exhibit eclectic, picturesque architectural details inspired by a variety of fashionable late 19th century American architectural styles. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: John Harned House
LOCATION: 26 Little Neck Road, Centerport
LISTED: 9/85
DATE: c1850
OWNERSHIP: Private
DESCRIPTION: Composed of two 2.5 story three bay gable roof sections built at the same time and an adjacent barn. It is architecturally and historically significant as a representative example of late settlement period architecture in the Town of Huntington and one of the few surviving historic resources associated with the 19th century history of Centerport. The properties continued agricultural use is indicated by the survival of the 19th century barn. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: N. Velzer House and Caretakers Cottage
LOCATION: 22 Fort Salonga Road, Centerport
LISTED: 9/85
DATE: c1830
OWNERSHIP: Private
DESCRIPTION: The Velzer House is a 2.5 story clapboard Greek Revival residence. Located on an adjacent lot is a 2.5 story clapboard caretakers cottage. The Velzer House retains a high degree of architectural integrity and is architecturally significant as the most distinctive example of vernacular Greek Revival style architecture in the Town of Huntington. It was one of the first residences in Huntington to deviate from standard local building traditions. Huntington Town Multiple Resource Area. Good condition. Limited public access.

LISTING: E.G. Lewis House
LOCATION: Waterside Road, Northport
LISTED: 9/85
DATE: c1855
OWNERSHIP: Private
DESCRIPTION: Once part of a large land holding this 4.2 acre parcel includes a 2 story Italianate residence, late 19th century carriage house and spring house and an early 20th century water tower. The residential complex maintains its wooded setting. The main house is architecturally significant as an important example the effect of early picturesque taste affected local building traditions. It is historically significant as one of the few unaltered properties in Northport that recall its 19th century

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development.Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: N.J. Felix House
LOCATION: 235 Asharoken Avenue, Asharoken
LISTED: 9/85
DATE: 1900
OWNERSHIP: Private
DESCRIPTION: 2.5 story shingled and clapboard residence in an eclectic combination of Colonial Revival and Queen Anne style. It is architecturally significant as a representative example of the large upper income single family dwellings built along Huntington's north shore during its rapid development at the turn of the century. It is one of the few intact early 20th century dwellings to survive in the Village of Asharoken. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Delameter-Robinson House
LOCATION: 536 Asharoken Avenue, Eatons Neck
LISTED: 9/85
DATE: 1903
OWNERSHIP: Private
DESCRIPTION: 2.5 story rambling Tudor-Revival residence designed by local architect Harry E. Donnell. It is historically and architecturally significant as a distinguished mansion that recalls the development of Eatons neck as an exclusive turn-of-the-century residential enclave. It remains largely unaltered and retains its historic integrity. Huntington Town Multiple Resource Area. Good condition. No public access

LISTING: Delameter-Bevin Mansion
LOCATION: Bevin Lane, Asharoken
LISTED: 9/85
DATE: 1867
OWNERSHIP: Private
DESCRIPTION: 2.5 story clapboard Second Empire style residence with elaborate exterior and interior detailing. Originally the main residence on a large estate, the Delameter-Bevin Mansion lost its estate lands through subdivision. It is architecturally significant as one of the most fully developed examples of Second Empire style residential architecture in the Town of Huntington. It is historically significant as one of the oldest, extant dwellings in the Village of Asharoken. Huntington Town Multiple Resource Area. Good condition. Limited public access.

LISTING: Harry E. Donnell House
LOCATION: 71 Locust Lane, Eatons Neck
LISTED: 9/85
DATE: 1902-3
OWNERSHIP: Private
DESCRIPTION: 2.5 story Tudor-Revival residence designed by locally prominent architect Harry E. Donnell as his private home. It is architecturally

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significant as an intact representative example of the upper income residential architecture built throughout Huntington's north shore at the turn-of-the-century. Huntington Town Multiple Resource Area. Excellent condition. Limited public access.

LISTING: Fort Salonga
LOCATION: Smithtown
LISTED: 5/82
DATE: 1776-81
OWNERSHIP: Private
DESCRIPTION: Archaeological site of square earthen Revolutionary War fortification, part of a network of British military forts on Long Island. It is significant for its historical associations and its archaeological research potential. Limited public access.

LISTING: Wyandanch Club Historic District (Caleb Smith State Park)
LOCATION: Jericho Turnpike
LISTED: 8/90
DATE: c1751-1912
OWNERSHIP: Public
DESCRIPTION: A 518 acre property developed in the late 19th and early 20th century as a hunting and fishing club. It contains 5 principal buildings set in an extensive tract containing undeveloped woodland, open space and natural waterways. The District derives much of its character from its preserved, naturalistic landscape, the result of early settlement and industry that was later incorporated into an extensive hunting and fishing club. The contributing structures include the Vail House (c1810-20) and outbuildings, Chipman House (late 18th century), Caleb Smith House (c 1751, enlarged late 19th century for use as clubhouse), and the Whitman Farmhouse (early 19th century)and outbuildings. Each of these exhibit distinctive characteristics of its original construction period aa well as that of the Club period. The property has historical, architectural, recreational, agricultural and commercial significance. It recalls the early development of the area and reflects the trend toward recreational use that characterized the region at the turn of the century. Acquired 1963 by State of New York. Limited public access

LISTING: Blydenburgh Park Historic District
LOCATION: Blydenburgh County Park, Smithtown
LISTED: 8/83
DATE: c1800-c1900
OWNERSHIP: Public
DESCRIPTION: 10 acre area encompassing the remains of an intact, early Long Island settlement called Bushy Neck. It is located within the large Blydenburgh County Park (580 acres). There are 9 structures in two clusters, a mill complex and a farm complex. Includes 2 story New Mill (c1800), Federal Millers Cottage (c1802), the Isaac Blydenburgh House (1821), the Gothic revival Blydenburgh Cottage (c1850), and dependencies. The Historic District is historically and architecturally significant as a rare surviving Long Island settlement. It is closely associated with the early

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19th century development of Smithtown and its locally prominent families and contains significant examples of early 19th century Long Island architecture. Good/deteriorated condition. Limited public access.

LISTING: Stony Brook Harbor Estates Thematic Resources
LOCATION: Stony Brook Harbor
DESCRIPTION: The Stony Brook Harbor Estates Thematic Resources listing draws together a collection of properties in the vicinity of Stony Brook Harbor. This is a remarkable collection of architecturally and historically significant Long Island country houses, related outbuildings and landscaped grounds. Sharing both the geographic and socio-economic factors that led to the development of estates on Stony Brook Harbor in the period around the turn of the 20th century, these properties form an unusually cohesive group that unifies by extensive family inter-relationships, historical connections and ties with the architectural profession. These development of these estates reflect the transformation of an isolated agrarian community into an exclusive enclave of second homes for wealthy urbanites, a trend that was taking place all along the western section of the Long Island Sound shoe, a trend that saw the shoreline transformed into the sc-called "Gold Coast". This was due in part to the proximity of Stony Brook Harbor to the Sound and New York City and to the complex links between the development of the Stony brook Harbor and its ties with the prominent Smith family. Unlike the vast estates of the super rich, located for the most part in Nassau County, the Stony Brook Harbor estates were smaller in scale and linked closely to the history of the region, some of the estates are actually surviving early farmsteads associated with the early settlement period.

The Stony Brook Harbor estate type is characterized by a large, distinguished estate house with views of the harbor, sited on a substantial parcel landscaped to effect a naturalistic country setting. these states generally include a variety of secondary buildings and structures that represent the estate's functional history and the lifestyles of the owners. The estates resulted from the distribution of a large family fortune and landholding between the descendants of Richard Smith an early settler and manorial land owner of the area that has become Smithtown. A number of the estates are significant as the work of nationally prominent architectural firms, whose partners were friends or relatives of the clients or indeed owners of the estates themselves.

The individual listings are discussed below.

LISTING: Rassapeaque (Francis C. Huntington and Susan Butler Huntington Estate)
LOCATION: Long Beach Road, Nissequogue
LISTED: 8/93
DATE: c1865, c1915
OWNERSHIP: Private
DESCRIPTION: 23 acre estate composed of a large, mid-nineteenth century house with later additions designed by Lawrence Smith Butler, three contributing

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support buildings and extensive lawns and fields overlooking Stony Brook Harbor. The house is a 2 story wood-frame clapboard Italianate dwelling that retains representative exterior detailing, with restrained Colonial Revival alterations. The integrity of the estate and its contributing components remain high. The estate is significant as an example of a mid 19th century gentleman farm that was adapted to serve as a country estate. Stony Brook Harbor Estates Thematic Resources

LISTING: Land of Clover (Lathrop Brown Estate)
LOCATION: Long Beach Road, Nissequogue
LISTED: 8/93
DATE: 1912
OWNERSHIP: Private
DESCRIPTION: 60 acre estate composed of a large brick Georgian Revival dwelling and a number of historic and contemporary dependencies. The main house, now known as Houghton Hall, was designed by Peabody, Wilson and Brown for Lathrop Brown. Exterior and interior detailing is constrained and remains relatively intact. Contributing dependencies include the horseshoe stable, superintendent's cottage, ice house and garage, U-shaped barn and water tower. The estate is significant as a distinctive example of a turn-of-the-century Stony Brook Harbor estate property, recalling the last phase (c1878-c1930) in the recreational development of Long Island. The estate is also significant for the designs of architect Archibald Brown. Now used as a boarding school, a use that has helped maintain the open estate character of the property. Stony Brook Harbor Estates Thematic Resources.

LISTING: James W. Phyfe and Anne Smith Phyfe Estate
LOCATION: 87 Stillwater Road, Nissequogue
LISTED: 8/93
DATE: 1904
OWNERSHIP: Private
DESCRIPTION: Originally part of a large estate that has been reduced through subdivision and residential development, the remaining 6 acre parcel includes a large Neoclassical style house set in manicured lawns and adjoining carriage house. Includes extensive exterior detailing and spacious interior.The estate house is architecturally and historically significant as a distinctive intact example of the Stony Brook Harbor estate type designed by well known regional architect Isaac H. Green Jr.. Stony Brook Harbor Estates Thematic Resources.

LISTING: William J. Ryan Estate (Nissequogue Golf Club)
LOCATION: Moriches Road, Nissequogue
LISTED: 8/93
DATE: 1930
OWNERSHIP: Private
DESCRIPTION: 126 acre golf course, once the former William J. Ryan Estate. Despite the development of the golf course, the current landscape recalls the original open estate landscape and does not compromise the setting of the Georgian Revival estate house, designed by Bradley Delehanty, now

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the clubhouse. Both the exterior and interior retain a high degree of integrity. The estate is architecturally significant as a distinctive example of the Stony Brook Harbor estate type and is the last of the large country houses to be built on Stony Brook Harbor. Stony Brook Harbor Estates Thematic Resources.

LISTING: Beachbend (William H. Dixon Estate)
LOCATION: Smith Lane, Nissequogue
LISTED: 8/93
DATE: c1700, c1924
OWNERSHIP: Private
DESCRIPTION: Composed of a large eighteenth century Colonial house with 20th century Colonial revival alterations, designed by Peabody, Wilson and Brown, and dependencies set in 19.4 acre estate. Beachbend is historically and architecturally significant as a distinctive intact example of an estate on Stony Brook Harbor that retains substantial integrity to both the settlement era and the estate period. It typifies the type of country house and grounds that resulted from the sensitive conversion of an existing Colonial period house at the turn-of-the-century and retains the restrained wood detailing associated with Long Island Vernacular farmhouses of the settlement era. Stony Brook Harbor Estates Thematic Resources.

LISTING: Woodcrest (Homer Reboul Estate)
LOCATION: Moriches Road, Nissequogue
LISTED: 8/93
DATE: 1895
OWNERSHIP: Private
DESCRIPTION: Composed of a large principal building, two contributing dependencies and a formal garden set in a wooded area of 30 acres, all that remains of a substantially reduced estate. Subdivision of the remaining acreage has resulted in adjacent residential development. The main house is a 2 story Colonial Revival residence in the shingle style. The house is situated with great respect to the topography of the property and with carefully designed vistas of the harbor, Long Beach and the Sound. Interior features have considerable interest. Woodcrest is architecturally significant as a representative early work of the noted Long Island architect Isaac Green, Jr.. The design embodies the features associated with Stony Brook Harbor estates and was built within the period of greatest concentration of estate planning in the area. Stony Brook Harbor Estates Thematic Resources.

LISTING: Harbor House (George C. Case Estate)
LOCATION: Spring Hollow Road, Nissequogue
LISTED: 8/93
DATE: 1910
OWNERSHIP: Private
DESCRIPTION: 22 acre estate composed of large principal dwelling, associated dependencies, landscaped lawns and formal garden set on a heavily wooded parcel. The entire estate parcel is intact as planned. The

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Colonial Revival main house is eclectic in style and includes aspects of the Dutch Colonial mode with features associated with the Queen Anne and Shingle styles. Interior and exterior features retain a high degree of integrity. Harbor House is a distinguished and representative example of the turn-of-the-century Stony Brook Harbor estate type. The estate is historically significant for its associations with the Smith family and is architecturally significant as an intact large scale and well designed example of the country house genre, designed by the firm of Ford, Butler and Oliver. Stony Brook Harbor Estates Thematic Resources.

LISTING: By-the-Harbor (Prescott Hall Butler and Cornelia Smith Butler Estate)
LOCATION: Moriches Road, Nissequogue
LISTED: 8/93
DATE: c1872-1905
OWNERSHIP: Private
DESCRIPTION: 27 acre property that once extended to Stony Brook Harbor. The property includes a relatively small Shingle style country house and contributing dependencies, including a restored casino. The integrity of the main house remains high in spite of a recent damaging fire. By-the-Harbor is historically and architecturally significant as the first of the group of country houses built on Stony Brook harbor dating the period 1878-1930 and as an early and precedent setting example of the idiom later named Shingle Style. It represents one of architect Charles McKim's earliest projects. Historically the house represents the first of several Smith family projects to transform the shoreline of Stony Brook Harbor. Stony Brook Harbor Estates Thematic Resources.

LISTING: Shore Cottage (Lawrence Grant White and Laura Chandler White Estate)
LOCATION: Harbor Road, Head of the Harbor
LISTED: 8/93
DATE: 1913
OWNERSHIP: Private
DESCRIPTION: 2.5 story Revival cottage clad in stucco and associated barn on 1.7 acres. Designed by Lawrence Grant White for his family. Originally part of the White family's once expansive Box Hill estate, the properties have been separated by modern subdivisions. The cottage remains virtually unaltered and retains its architectural integrity. Shore Cottage is historically and architecturally significant for its connections with the Stony Brook Harbor estates, their development and the close network of families in the area. Stony Brook Harbor Estates Thematic Resources.

LISTING: Box Hill Estate
LOCATION: Moriches Road, St James
LISTED: 12/73
DATE: 19th century
OWNERSHIP: Private
DESCRIPTION: 20 acre estate overlooking Stony Brook Harbor featuring rambling Colonial revival/eclectic residence surfaced in pebble-dashed stucco. Originally built as simple farmhouse, purchased and enlarged by architect Stanford White and his son Lawrence Grant White as family

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summer residence. Notable interior. Property includes formal gardens, farm complex and octagonal water tower. Lawn features "Diana" sculptured by Augustus Saint-Gaudens. The property has architectural significance as an invaluable document of White's design and tastes. Excellent condition. Limited public access.

LISTING: Kate Annette Wetherill Estate
LOCATION: Harbor Hill Road, Head of the Harbor
LISTED: 8/93
DATE: 1895
OWNERSHIP: Private
DESCRIPTION: 26.75 acre estate overlooking Stony Brook Harbor featuring a large octagonal Colonial Revival style house and associated structures. The original estate has been subdivided, however, the estate setting is remarkably intact. The wood shingled house retains a wealth of period detail. The estate is architecturally significant as a distinctive and unusual example of architect Stanford White's country house genre. Despite its unusual and innovative design, the house is representative of the Stony Brook Harbor estate type in setting, detailing and scale. The estate was part of the tight knit social set of the locally prominent Smith family. Stony Brook Harbor Estates Thematic Resources.

LISTING: Sherrewogue (Ella Smith Emmet and Devereux Emmet Estate)
LOCATION: 79 Harbor Road, Head of the Harbor
LISTED: State Register, 10/13/92
DATE: c1689, c1850, c1895, 1910
OWNERSHIP: Private
DESCRIPTION: 11.95 acre estate composed of a primary estate house, 11 contributing dependencies, and formal garden set within an intact naturalistic setting overlooking Stony Brook Harbor. The original landholdings of the estate extended over several hundred acres, but has been significantly reduced through subdivision. The estate house is a large wood shingled Colonial period dwelling with significant Colonial Revival additions designed by Stanford White. A complex of farm and estate dependencies remain intact. The estate is historically and architecturally significant as an ancestral, settlement period homestead of the Smith family that was acquired in the late 19th century by a descendant of the family and converted into an estate typical of the era and location. Stony Brook Harbor Estates Thematic Resources.

LISTING: Thatch Meadow Farm (George W. Bacon Estate)
LOCATION: Harbor Road, Head of the Harbor
LISTED: State Register, 10/13/92
DATE: c1750,c 1912
OWNERSHIP: Private
DESCRIPTION: 22.7 acre estate featuring a Colonial period dwelling with Colonial Revival and Federal period additions, designed by the firm of Peabody, Wilson and Brown, two cottages and a cluster of farm buildings. The integrity of the house and outbuildings remains high. Historically a Smith family farm of over 200 acres, much of the original acreage has

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been subdivided for residential development, although the estate setting remains. The estate is architecturally distinguished as a representative example of an 18th century settlement period farmhouse converted into a Stony Brook Harbor country retreat. Stony Brook Harbor Estates Thematic Resources.

LISTING: East Farm (Archibald M. Brown Estate)
LOCATION: Harbor Road, Head of the Harbor
LISTED: 8/93
DATE: c1710, c1910
OWNERSHIP: Private
DESCRIPTION: 31 acre estate featuring open farmland, woodland, noted plantings,, a formal garden, an estate house and several historic farm buildings. Originally an 18th century Smith family farmhouse, the Colonial building was greatly enlarged in the Colonial Revival style in 1910 by the architect Archibald Brown as his own personal country residence. The estates appearance today is virtually unaltered from the conversion of the farm into a country residence. The estate is architecturally significant as an intact representative example of an 18th century settlement period farmhouse converted into a Stony Brook Harbor country retreat.Stony Brook Harbor Estates Thematic Resources.

LISTING: The Mallows (Alida Chanler Emmet and Christopher Temple Emmet Estate)
LOCATION: Emmet Way, Head of the Harbor
LISTED: 8/93
DATE: 1906
OWNERSHIP: Private
DESCRIPTION: A small 4.1 acre property, once part of a 150 acre estate now subdivided for residential development. The estate house is all that survives intact. Designed by Charles A. Platt, the house is a Colonial Revival dwelling finished in Stucco with powerful wooden detailing. The house has a high level of integrity. It is significant as an intact representative example of the Stony Brook Harbor estate type. Stony Brook Harbor Estates Thematic Resources.

LISTING: St James Historic District
LOCATION: North Country Road, St James
LISTED: 7/73
DATE: 18th/19th century
OWNERSHIP: Private
DESCRIPTION: 90 acre corridor centered on three major properties: the 2.5 story Federal shingled Timothy Smith House (c1800, moved and enlarged c1906), 2.5 story Greek Revival frame house of the Deepwells Estate (1845-7), and the Gothic Revival frame St James Episcopal Church (1853) which features stained glass by L.C. Tiffany. Also includes St James Railroad Station, St James General Store and other 19th century frame buildings. The Historic District is significant as a cluster of structures illustrating a variety of architectural styles popular in rural

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Long Island through the 19th century. Good condition. Limited public access.

LISTING: Mills Pond District
LOCATION: North Country Road, Smithtown
LISTED: 8/73
DATE: 18th/19th century
OWNERSHIP: Private
DESCRIPTION: 200 acre corridor based around an historic farming hamlet dominated by the clapboard frame Greek Revival Mills Homestead (1837, designed by Calvin Pollard) and dependencies. The district is an unusual survival of a tiny agricultural hamlet.The special character of the District is derived from the preservation of the few structures of the hamlet in their historical environment. Good condition.

LISTING: Stony Brook Grist Mill
LOCATION: Harbor Road, Stony Brook
LISTED: 8/90
DATE: c1750
OWNERSHIP: Private
DESCRIPTION: 2.5 story wood frame, shingled grist mill in the Dutch tradition. Property includes adjacent sluice, weir, dam and mill pond. The mill building has been enlarged over the years to account for changing functional requirements. Despite alterations, the mill retains significant integrity and contains important surviving milling apparatus. Restored in the late 1940's. The Grist Mill is historically and architecturally significant as a distinctive example of a vernacular mil building on Long Island that retains evidence of its original construction and use, as well as significant additions and alterations that help to explain its continued role as a viable commercial operation.

LISTING: Hawkins Homestead
LOCATION: 165 Christian Avenue, Stony Brook
LISTED: 6/88
DATE: c1660
OWNERSHIP: Private
DESCRIPTION: Small colonial shingled farmhouse, with large additions (c1720, c1750, c1812). In spite of numerous additions, alterations and renovations, a substantial portion of the historic fabric of the dwelling and the settlement period aesthetic remain intact. It is architecturally and historically significant as a distinguished, largely intact example of early settlement period domestic architecture that recalls the early agrarian settlement and growth of this area. Long association with prominent settlement period family. Good condition. Limited public access.

LISTING: Caroline Church and Cemetery
LOCATION: Dyke Road, Setauket
LISTED: 9/91
DATE: 1729
OWNERSHIP: Private

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DESCRIPTION: Colonial shingled church dominated by a 42 foot tower topped with a 25 foot spire, built in 1729 by John Spears. Several additions including a 1905 parish hall. Restored in 1937. Property includes barn, horse shed and an historic cemetery, established in 1734. The property represents an architecturally significant and rare surviving example of early 18th century ecclesiastical architecture and funerary art. It retains significant evidence of its original method of construction. It is the oldest extant Episcopal Church building on Long Island and is considered the regions oldest public structure. The property reflects the growth and development of the area and changes in local history and culture.

LISTING: Miller Place Historic District
LOCATION: North Country Road, Miller Place
LISTED: 6/76
DATE: mid 18th - mid 19th century
OWNERSHIP: Private
DESCRIPTION: The Historic District encompasses a concentration of properties in the rural vernacular architectural style characteristic of Long Island from the mid 18th to mid 19th century. It represents a rare vestige of Long Island's rapidly vanishing past. The core of the hamlet the District includes 27 principal buildings and their dependencies. The structures are consistently homogeneous in scale and integrity and the district constitutes a coherent architectural and geographic entity largely uncompromised by modern intrusion. Notable buildings include the Greek Revival Reverend Ezra King House (c1840), the Federal Miller Place Academy (1834), and Georgian William Miller House (c1720). The Historic District spans the coastal area boundary. Good condition. Limited public access.

LISTING: Hallock Homestead
LOCATION: 163 Sound Avenue, Northville
LISTED: 6/84
DATE: c1765, 1845
OWNERSHIP: Private
DESCRIPTION: Large vernacular shingled farmhouse incorporating original structure dating from c1765. Property includes barn, milk house, shop/wood house and privy. Many original features remain. The Homestead is architecturally and historically significant as one of the oldest extant farm complexes on the North Fork, a representative example of an historic Long Island farm. It is associated with a locally prominent family. Fair condition. Limited accessibility.

LISTING: Terry-Mulford House
LOCATION: NY Route 25, Orient
LISTED: 2/84
DATE: Late 17th century
OWNERSHIP: Private
DESCRIPTION: 2.5 story shingled New England saltbox with c1700 rear lean-to and other later additions. Includes well cover and small shed on a 6 acre property. The property is architecturally significant as one of the few

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surviving examples of an early settlement period house on Long Island. It is believed to be the only remaining house of the original 7 built in the hamlet of Orient and is historically significant for its long and continuing association with the history and development of Orient. Fair condition. Limited public access.

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Appendix 2

Description of Shoreline Configuration and Ecological Complexes

SHORELINE DIVISION	SHORELINE DESCRIPTION
NARROWS COMPLEX	
State line-North Manursing Island	Mouth of Byram River and Port Chester Harbor. Coastal salt pond behind connected islands. Marine rocky intertidal communities on outcrops. Maritime beach community on sandy beaches. Dredged channels.
North Manursing Island- Playland Park	Maritime beach communities on sandy and rocky beaches on necks, backed by coastal salt pond "lagoon" areas. Large open space play areas with mowed lawn.
Playland Park-Pine Island	Complex shores with bars, sandy pocket, and concave beaches hosting maritime beach communities, suburban residential mowed lawns, and gardens. Offshore islands and rocks with marine rocky intertidal communities and patches of mixed hardwoods and shrubs.
Pine Island-Milton Point	Complex shoreline at peninsula end, dropping off into islands and offshore rocks; suburban residential plantations, gardens, and mowed lawns; marine rocky intertidal communities; marine intertidal mudflats; maritime beach communities on sandy beaches.
Milton Point-Edgewater Point	Complex indented cove, includes Milton Harbor and Mamaroneck Harbor. Large area of protected salt marsh. Several islands-the largest support mixed hardwoods and shrubs; the small islands contain marine rocky intertidal communities. Formerly tidal coves now impounded to form fresh and brackish artificial ponds. Marine intertidal mudflats and rip-rap throughout suburban residential mowed lawns with trees; large golf course. Dredged channels.
Edgewater Point-Umbrella Point	Small complex cove in recreational use; former land filling use and current

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	composting facility. Several small beaches controlled by groins. Ecological communities include marine rocky intertidal (islands and shoreline), mowed lawn with trees, marine rip-rap, salt marsh, and intertidal mudflats. Dredged channels.
Umbrella Point-Davenport Park	Small complex cove in recreational and residential use, former tidal river impounded to form fresh pond. Salt marshes, marine intertidal mudflats, marine rocky intertidal communities, marine rip-rap, and suburban residential mowed lawns with trees. Island with mixed hardwoods and mowed lawn in recreational use. Bulkheaded creeks. Dredged channels. Outstanding example of marine rocky intertidal/salt marsh community complex at Davenport Park.
Davenport Park-Westchester County line	Complex series of inlets; islands supporting marine rocky intertidal communities and mowed lawn with trees; marine intertidal mudflats; marine rip-rap and bulkheaded shore; former landfill areas with current composting activity. Bridges connecting island parks to mainland. Small yachting harbors.
New York City line-High Island	Wide flat coastal plain embayment fronted by sandy, man-made Orchard Beach, which is part of the 2,100 acre Pelham Bay Park. More than 1,200 acres of the park is comprised of salt marsh, successional old field and shrubland, and mixed hardwood forest. A former strait is now a lagoon with poor connection to Eastchester Bay to the south. Remaining parkland is covered lawn with trees, golf course, play areas, and parking fields. Hills rise gently to north, Hutchinson River empties to Eastchester Bay past closed landfill. Intertidal salt marshes extensive. Marine rocky intertidal communities along portions of shoreline of islands. Larger islands forested with mixed hardwoods. Dredged channel.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
High Island-Belden Point	City Island: Highly urbanized island with artificial shore and piers. Fronted by Hart Island and associated small rock islands that support marine rocky intertidal communities and provide haulout areas for seals.
Pelham Bay Park-Throgs Point	Closed municipal sanitary landfill revegetating with successional old field community; successional old field and mowed lawn with trees in park setting; urban and suburban structural landscape along sandy beach south to Throgs Neck Bridge. Fragments of salt marsh communities along shore with occasional marine rocky intertidal communities.
Little Boy-Fort Totten	Concave beach beached by Cross island Parkway. Fort Totten Military Reservation on small point with simple shoreline. Mowed lawn with trees along rip-rap and sandy shore in reservation and in associated parkland to west. Isolated areas of successional maritime forest and shrubland.
Fort Totten-City line	Simple inlet with salt marshes and successional maritime forest at head. Parkway and associated shoreline park with mowed lawn and trees on west. Isolated areas of successional maritime forest and shrubland. Rip-rap shoreline and some sandy beach areas.
County Line-Saddle Rock	Southern section is small embayment with salt marsh; northern shore is straight sandy beach with rocks, backed by bluffs. Rises somewhat steeply to Saddle Rock. Salt marsh at north end of reach. Boulders support marine rocky intertidal communities.
Saddle Rock-Kings Point	Series of concave sandy beaches, backed in some stretches by bluffs. Small former inlet now impounded to form tidally influenced Udall's Mill Pond, which supports fresh and brackish marsh communities, surrounded by mowed lawn with trees in park setting and successional hardwood forest. Mowed lawn with trees associated with U.S. Merchant

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	Marine Academy as well as suburban development adjacent to much of shore.
Kings Point-Hewlett Point	Long, concave beach, partially backed by bluffs, forms western side of Great Neck; several offshore rocks support marine intertidal community; artificial shore of bulkheads, revetments, and piers; mowed lawn with trees in suburban developed areas behind beaches.
Hewlett Point-East of Mitchell's Creek	Two rock-strewn sandy beaches support marine intertidal and maritime beach communities. Red maple-hardwood swamp drains uplands into Mitchell Creek, which supports tidal creek and salt marsh communities. Low density suburban development with mowed lawns and small fragments of mixed hardwood forest in upland hills.
East of Mitchell's Creek-Plum Point Manhasset Bay	Embayment contained by Manhasset Neck and Great Neck. Several sharply indented drainages featuring creeks and impoundments that arise from red maple-hardwood swamps. Maritime beach, marine rocky intertidal, and marine intertidal mudflat communities supported along western shoreline; eastern shore features more artificial shoreline with many piers. Salt marsh and tidal creek in Village of Manorhaven. Fragments of mixed hardwood forest remain in parks and adjacent to swamps. High density suburban development.
Plum Point-Barker Point	Narrow sand bar, backed by tidal flats. Remaining shore to Barker Point is concave maritime sandy beach with offshore rocks supporting marine rocky intertidal community.
Barker Point-Sands Point	Wide embayment; concave maritime sandy beach divided by tidal creek with associated salt marsh. Maritime shrubland community at northern and southern perimeters of marsh.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	Small freshwater wetland and mixed hardwood forest drain into tidal creek. Marine intertidal mudflats along shore. Many offshore rocks supporting marine intertidal communities characterize the two points.
Sands Point-Prospect Point	Concave maritime sandy beach with some offshore rocks supporting marine rocky intertidal communities. Tidal creek and salt marsh behind beach drain to east, beyond Prospect Point.
Prospect Point-Mott Point	Straight maritime sandy beach with marine intertidal mudflats toward Prospect Point and offshore rocks supporting intertidal community increasing toward Mott Point. East Creek, a tidal creek with associated salt marsh, drains east of Prospect Point. Maritime shrubland between marsh and beach. Sands Point Preserve, 215 acres adjacent to beach, contains large areas of mixed hardwood forest with two red maple-hardwood swamps. Bluffs toward Mott Point.
Mott Point-Bar Beach	Straight maritime sandy beach ending in large sand bar at Bar Beach in Hempstead Harbor. Groins and artificial shore interrupt beach, which is backed by bluffs as well as some large fragments of mixed hardwood forest along northern stretch; maritime shrubland, mixed hardwood forest, red maple-hardwood swamps, and old field communities along southern stretch where not disturbed by previous sand and gravel mining operations. Large sand pit, just west of Hempstead Harbor County Park, remains disturbed and largely unvegetated.
Bar Beach-Glenwood Landing	Narrow and long restricted embayment with extensive marine intertidal mudflats; salt marsh and maritime shrubland along western shore. Bluffs backed by mixed hardwood forest, freshwater ponds, and associated wetlands at head of harbor separate light industrial and commercial uses from high density residential areas. Old field

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	vegetation, mixed hardwood forest bluffs, and ponds featured in large county park on east side of harbor. Low density development in Roslyn Harbor features mowed lawns and scattered trees as well as fragments of mixed hardwood forest.
Glenwood Landing-Cliff Way Avenue	Tappen Beach: Maritime sandy beach with marine intertidal mudflat community on sandy shoal. Beach backed by sparsely vegetated bluffs, adjacent to medium to high density residential development. Small pond and associated freshwater wetland, mixed hardwood forest fragments in large golf course at southern end.
Cliff Way Avenue-Glen Cove Landing	Long, narrow modified cove with artificial shoreline, industrial development, and sewage plant at head. Flanked by marine intertidal mudflats, maritime shrubland, and sandy beach communities; bounded by steeply rising uplands with residential development and county park. Garvies Point Preserve County Park features mixed hardwood forest, bluffs exposing Cretaceous deposits, offshore rocks supporting marine rocky intertidal community.
Glen Cove Landing-Red Spring Point	Straight maritime sandy beach backed at southern stretch by bluffs; large residential estates featuring mowed lawns with trees.
Red Spring Point-West Pond	Straight maritime sandy beach with Weeks Point and associated bluffs interrupting the southern end; marine rocky intertidal communities along shoreline on large boulders. Tidal creek and small salt marsh in southern one-third. Large area of mixed hardwood forest drains into red maple-hardwood swamp.
West Pond-Matinecock Point	Barrier beach with maritime sandy beach community and Dosoris Island backed by coastal salt ponds. Marine rocky intertidal community toward Matinecock Point. Mowed lawn with trees and small freshwater wetland in residential area.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
Matinecock Point-Peacock Point	Barrier beach with maritime sandy beach community backed by Dosoris Pond along western end. Small salt marsh on southern shore of Dosoris Pond. Island Swamp Brook is major drainage to Dosoris Pond; features red maple-hardwood swamp and chain of freshwater ponds surrounded by mixed hardwood forest. Large areas of mowed lawn with trees associated with institutions and golf course.
HARBORS COMPLEX	
Peacock Point-Fox Point	Concave maritime sandy beach (The Creek Beach) features maritime shrubland communities. Red maple -hardwood swamps adjacent and draining to salt marshes. Chestnut oak forest in uplands fragmented by large-lot development and large golf course with associated mowed lawn with trees. Portions of salt marsh filled and converted to golf course.
Fox Point-Oak Neck Point	Stehli Beach: Straight maritime sandy beach backed by Frost Creek and salt marsh. Oak Neck Beach: maritime sandy beach turns from Stehli Beach to north; backed by Oak Neck Creek (empties into Mill Neck Creek) and associated salt marsh and maritime shrubland at west end; backed by bluffs toward Oak Neck Point. Marine intertidal mudflats and offshore rocks supporting marine rocky intertidal community. Beach fronts densely developed Village of Bayville.
Oak Neck Point-Rocky Point	Ferry Beach: Long, narrow, concave maritime sandy beach ending at Rocky Point and large natural reef. Tidal Creek emptying salt marsh interrupts lower one-third of beach. Mixed hardwood forest and maritime shrubland and adjacent to marsh. Large lot development and associated mowed lawns with trees.
Rocky Point-Plum Point	Convex beach forming eastern side of Centre Island, connected to shore by narrow neck of

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	Centre Island Beach; tidal flats along shore; swampland along small river inlet.
Plum Point-Moses Point, Cove Neck-Cooper Bluff	Two somewhat parallel shores along entrance to Oyster Bay Harbor, both with maritime sandy beaches and marine intertidal mudflats; Plum Point and Moses Point are on Centre Island, and Cove Point and Cooper Bluff are on Cove Neck, a peninsula that extends north, separating Oyster Bay Harbor and Cold Spring Harbor. Both shores feature piers and are backed by scattered development with fragments of mixed hardwood forest and mowed lawn with trees.
Moses Point-Brickyard Point, Spring Lake-Cove Neck	Continuation of Oyster Bay Harbor, enclosed by maritime sandy beaches and artificial shore. At western end of the southern section of this reach, Spring Lake drains red maple-hardwood swamp and surrounding chestnut oak forest communities to lower Oyster Bay Harbor. At southwest of harbor, chestnut oak forest and red maple-hardwood swamp communities drain into Mill Pond, then through culverts and channel to Oyster Bay. At southeast, Tiffany Creek drains chestnut oak forest and red maple-hardwood swamp to salt marsh at Oyster Bay Cove. Artificial shoreline fronts hamlet of Oyster Bay, which is densely developed. Mixed hardwood forest behind residential area along Centre Island portion of this reach. Large lot development in remaining areas; mowed lawn with trees.
Brickyard Point-Bayville Bridge, Bayville Bridge-Spring Lake	Interior of Oyster Bay Harbor, enclosed by Centre Island and Mill Neck, with Mill Neck Creek flowing from west. Extensive marine rip-rap shoreline along Shore Road leading to Bayville Bridge. Mill Neck features estates and large lots with fragments of chestnut oak forest surrounded by mowed lawn with trees. Mill Neck Creek has large watershed; primary drainage is Beaver Brook, which drains Upper and Lower Francis Ponds, Shu

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	Swamp, and surrounding chestnut oak forest. Beaver Brook and creek drains Kentucky Pond and associated red maple-hardwood swamps and chestnut oak forest to tidal creek and salt marsh. Oak Neck Creek joins Mill Neck Creek from north. Mill Neck Creek features extensive salt marsh and marine intertidal mudflat communities. Maritime sandy beach with marine intertidal mudflats and marine rocky intertidal communities along west side of Centre Island.
Bayville Bridge-Mill Neck Creek	Tidal inlet with several small streams draining uplands; complex shore with saltmarsh, intertidal mudflats, and some rocks and sand toward outer sections of Mill Neck Creek.
Coopers Bluff-County Line	Western side of Cold Spring Harbor; straight beaches along perimeter of Cove Neck, rising bluffs at end of neck; on west, intertidal mudflats and sandy beaches rise steeply to flat plain
County line-Whitewood Point	Eastern side of Cold Spring Harbor extending north from freshwater impoundment ponds, fed by red maple-hardwood swamps and road runoff; long linear sandy beach with Lloyd Harbor inlet separating tombolo of Lloyds Neck from land, except for the narrow Lloyd beach connector; sandy shore rises steeply to coastal upland, steep bluffs topped with maritime shrubland communities and mixed hardwood forests, interspersed by developed areas with mowed lawn.
Whitewood Point-Lloyd Point	Barrier beach with associated lagoon and salt marsh ending in Lloyd Point (SCFWH); broad sandy beaches on either side backed by Lloyd Neck.
Lloyd Point-East Fort Point	Convex sandy beach with considerable exposed rock, featuring rocky intertidal communities; intertidal mudflats, backed by Lloyd Neck, undulating gentle rises topped by mixed hardwood forests of Caumsett State Park; residential development to the east with mowed lawns.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
East Fort Point-East Beach (south)	East Beach: Flat, irregularly shaped sand bar fronting Lloyd Harbor, widening toward south tip, backed with a few salt marsh areas.
Lloyd Harbor	Narrow long embayment separating Lloyd and West Necks almost completely; primarily sandy beach with a few salt marshes and intertidal mudflats; terrain rises fairly steeply on either side, to mixed hardwood forests; to the east beaches backed by large lot residential development with mowed lawns.
Huntington Harbor	Narrow irregular inlet with pocket beaches and intertidal mudflats, marinas; upland mostly developed with marina support facilities, yacht clubs with a few large scattered areas of mixed hardwood forests; fresh water wetlands drain to the head of the harbor from the south.
Wincoma Point-Crescent Beach	Crescent Beach: Simple convex sandy beach with offshore rocks (and associated rocky intertidal communities) at west end; backed by developed areas interspersed with several small forested parks and a few freshwater wetlands.
Crescent Beach-Little Neck Point	Wide mouth embayment narrowing to restricted Centerport Harbor, partly backed by bluffs; sand bar, an extension of Centerport Beach, reaching into harbor, bordered by intertidal mudflats; causeway extends across harbor to form a freshwater impoundment, Mill Pond.
Little Neck Point-Duck Bluff	Large open embayment with low coastal plain topography of sandy beaches narrowing toward Northport Harbor; inner harbor has extensive intertidal mudflats, and is contained by steeply rising uplands; several yacht clubs; freshwater wetlands bordered by forested areas at the head of Northport Harbor.
Duck Bluff-Winkle Point	Triangular harbor and lagoon with intertidal mudflats and some salt marsh, formed by Eatons Neck to west and sand bars to north

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	and east; several irregular necks jut into harbor.
Winkle Point-West Beach (south)	Embayment contained by flat sand bar (with intertidal mudflats and scattered salt marsh fringes) and south shore of Eatons Neck (Sand City, a narrow sparely vegetated sand, gravel and cobble peninsula shore surrounding tidal mud flats) rising gently, with considerable residential development toward Price Bend.
West Beach (south)-Eatons Neck Point	West Beach, Hobart Beach: Series of long shallow concave sandy beaches ending in an undeveloped barrier beach and lagoon featuring salt marsh and intertidal mudflats, and a small area of fresh water wetlands draining to salt marsh; all backed by mixed hardwood forests, at Eatons Neck Point (SCFWH); several rocks at entrance to lagoon.
Eatons Neck Point	Short straight beach with rock outcrops featuring marine rocky intertidal communities to east, marked by US Coast Guard station and light.
Eatons Neck Point-Asharoken Beach (north)	Straight beach with some offshore rocks backed by gently rising upland.
Asharoken Beach (north)-Crab Meadow	Asharoken Beach: Shallow and very narrow crescent-shaped sandy beach with linear residential development connecting Eatons Neck to land; North Port Basin (LILCO intake), LILCO substation, Blanchard Lake with freshwater wetlands bordered by mixed hardwood forests just east of the substation, then ending with inlet to Crab Meadow.
Crab Meadow-Fresh Pond	Makamah Beach: Simple sandy beach, midsection backed by large undeveloped salt marsh at Crab Meadow (SCFWH); several streams in Crab Meadow Park and Golf Course, and forested areas of Makamah County Nature Preserve, to the south, drain into salt marsh. Some dammed streams form

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	shallow freshwater impoundments and have drowned trees. Makamah County Nature Preserve consists primarily of oak-hickory forest with a well developed understory. The forests also contain sprouts of American chestnut trees, once common in the forests of Long Island. Red maple swamp is dominant in the wetter areas. The Crab Meadow salt marsh has been extensively ditched. To the east, Fresh Pond, a freshwater impoundment, is encircled by freshwater wetlands, and is bordered on the west by a golf course and on the east by residential development with mowed lawn in Fort Salonga.
NISSEQUOGUE RIVER COMPLEX	
Fresh Pond-Nissequogue River	Callahans Beach: Straight sandy beach with some development to west; remainder backed by Sunken Meadow State Park (SMSP); large parking lots to immediate south of beach; beach ends in barrier beach backed by Sunken Meadow Creek; tidal flow to the western portion of the creek restricted by an earthen dam with undersized culverts; creek is bordered by forested areas within SMSP; red maple-hardwood swamps bordered by mixed hardwood forests in SMSP drain to the creek.
Nissequogue River-Long Beach (west)	Short Beach: Irregular shaped sand bar with sparsely vegetated dredge spoil area closing entrance to the Nissequogue River (SCFWH); river is extremely shallow with intertidal mudflats, small salt marsh islands and brackish marshes in its tidal portions; fresh water marshes, Red maple-hardwood swamps along the upper reaches of the river at in Caleb Smith State Park/Blydenburg County Park extending to the river's headwaters bordered by forests; straight sandy beaches, backed by bluffs and lightly developed residential lots and interspersed with blocks of forested areas, front Smithtown Bay. Portions of the bluffs are used as nesting sites for bank swallows.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
CENTRAL BAYS COMPLEX	
Long Beach (west)-Porpoise Channel	Long Beach: Sandy barrier beach with maritime dunes, backed by salt marshes and Porpoise Channel leading to Stony Brook Harbor; upland along Long Beach rises steeply to dunes and maritime shrubland from interior shore of lagoon; with lightly scattered development and lawn areas mixed with woodlands surrounding Stony Brook Harbor.
Porpoise Channel-Crane Neck (south)	West Meadow Beach: Lower section and barrier beach backed by West Meadow (SCFWH) and Meadow Creek; extensive undeveloped salt marsh and intertidal mudflats to south (eastern half of marsh has been partially ditched), with linear seasonal housing development; wide concave sandy beach to north backed by bluff and forested upland.
Crane Neck (south)-Crane Neck Point	Termination of Smithtown Bay, edged by bluffs, offshore rocks; interesting vegetated upland with maritime shrubland communities and chestnut oak forests, mixed with some home development on large lots with mowed lawn.
Crane Neck Point-Flax Pond (east)	Simple sandy barrier beach backed by Flax Pond (SCFWH); relatively undeveloped salt marsh, intertidal mudflats and shallow open water; Flax Pond opens to the Sound through a narrow channelized entrance; mixed hardwood forest, secondary growth, and remnants of maritime red cedar forests. DEC operates a marine biology research station at Flax Pond.
Flax Pond (east)-Old Field Point	Eastern of inlet to Flax Pond; remnant of maritime red cedar forests, straight sandy beach with little relief turns upward at Old Field Point (rip-rap erosion protection along the point), with numerous offshore rocks and navigational aids. Backed by a mix of forested uplands and homes on large lots with

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	mowed lawns; freshwater wetland to the east of inlet, mostly Phragmites; woodland remnant east of wetland approximates maritime oak holly forest with black gum, shad, holly black oak, red cedar, and beech but requires investigation for accurate classification.
Old Field Point- McAllister County Park (west)	Old Field Beach: Narrow cobble barrier beach backed by salt marsh and lagoon, some sandy areas; ends in entrance channel to Port Jefferson Harbor; some dune formations, but generally flat; Mt. Misery Point contains steep sandy bluffs, some dunes with maritime shrubland communities, sunken barges along the beach and some salt marsh around a small lagoon.
Port Jefferson Harbor Complex	Compound inlet with several bays surrounding Strongs Neck; generally shallow waters with extensive intertidal mudflats; Port Jefferson Harbor considerably deeper with several shore facilities; several freshwater wetlands in Old Field; a deciduous swamp with standing water throughout, the site of a black crowned heron rookery and a significant and amphibian breeding area; an open freshwater pond with little vegetation, artificially aerated. Fresh water discharges to the head of Conscience Bay Setauket Mill Pond (SCFWH); Strongs Neck has some successional old field communities, but mostly suburban development with mowed lawn. Significant intertidal mudflat communities at Little Bay. Setauket Harbor contains recreational and commercial clam boats and a town dock; southern section hardened, remainder is salt marsh. In Poquott, a projection to harbor upland consists of fragmented mixed hardwood forests showing signs of invasion by exotic species. Along LILCO power line right-of-way, vegetation provides a wildlife corridor.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
McAllister County Park (west)-Mt Misery Point	Flat barrier beach forming western arm of Port Jefferson Harbor; numerous sunken vessels on east shore of Mount Misery Point bulge.
Mt Misery Point-White Beach	Slightly convex beach with steep bluffs, partially vegetated with maritime shrubland communities, and topped with forested uplands; open freshwater ponds and wetlands on perched water table, backed by harbor.
White Beach-Cedar Beach (west)	Straight beach with widening sand area to east, including intertidal mudflats; steep bluffs rising to open forested upland, some home development and mowed lawn set back from bluffs; ends at Mt. Sinai Harbor Inlet.
Cedar Beach (west)-Miller Place Beach (east)	Cedar Beach: Long straight barrier beach backed by Mt. Sinai Harbor, contains extensive intertidal mudflats, well drained at low tide, salt marsh islands and shallow waters; shoreland rises to bluffs of 190 ft. at Miller Place Beach, where remnants of maritime red cedar forests are mixed with homes. South of Mt. Sinai Harbor, mixed hardwood forests of chestnut oak and oak-tulip tree with secondary growth forests that require further study for classification. Portions of the forests on mesic slopes have diverse understory. Steep forested slopes grade down to a fresh water wetland that feeds into a deciduous swamp. The swamp drains to salt marsh at the west end Mt. Sinai Harbor. To the east, Cordwood Landing County Nature Preserve contains mostly oak dominated deciduous forests, of white, black and red oak, American Beech and species of hickory, several open areas of grasses and wildflowers. The southern portion is dominated by successional forest of black cherry and locust. Dwarf forests of American Beech stunted by salt spray grow along the bluff. The preserve provides habitat for eastern cotton tail rabbits, gray squirrels, red fox, raccoon and a variety of song birds.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
EASTERN BLUFFS COMPLEX	
Miller Place Beach (east)-Rocky Point Landing	Scotts Beach: Straight beach with bluffs rising sharply to Sound Beach; suburban development along shore; small offshore islands and rocks with corresponding marine rocky intertidal communities.
Rocky Point Landing-Shoreham (east)	North Shore Beach: Straight fully developed beach with steep bluffs rising to hamlet of Rocky Point; several offshore rocks with corresponding marine rocky intertidal communities.
Shoreham (east)-Herod Point	Straight beach with steep bluffs rising to lightly developed land, much open space and natural vegetation including mixed hardwood forests; bluffs broken by Wading River and associated salt marsh (SCFWH).
Herod Point-Wildwood State Park (east)	Straight sandy beach with bluffs behind (partially vegetated with mixed hardwood forests and maritime shrubland communities), rising to complex topography; offshore rocks; Wildwood State Park on east.
Wildwood State Park (east)-Woodcliff Park (west)	Baiting Hollow State Tidal Wetlands: Concave sandy beach with filled salt marsh inlet drained by small tidal stream, some sandy dunes at western edge of salt marsh; backed by steep forested land dominated by large native beech trees, with a few freshwater ponds and freshwater wetlands bordered by forests; significant tracts of undisturbed woods exist within the park, away from camp grounds.
Woodcliff Park (west)-Friars Head	Straight beach with bluff rising steeply to flat uplands; numerous offshore rocks. Upland forested, but containing home development with mowed lawn, shoreline protection at toe of bluff.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
Friars Head-Roanoke Point	Convex relatively wide beach with bluffs (bluff face partially vegetated); at Baiting Hollow Boy Scout Camp, mixed hardwood forests with high percentage of mature beech trees; moist steep slopes partly covered by ferns grade landward to a deciduous swamp and large open freshwater wetlands with standing water; extensive maritime beech forests backed by forests similar to Appalachian oak-hickory forests; sunken vessels form beach extrusions at west end of the shore; village development at top of bluff at Roanoke Landing, parking lot and roadway lead to beach at Reeve Park Drive. To east largely undeveloped mixed hardwood forests.
Roanoke Point-Jacobs Point	Shallow concave sandy beach rising steeply to bluffs (bluff face partly vegetated) rugged undulating upland backed by deeply areas mixed hardwood forests and farmland. A few fresh water ponds lie within forested uplands. Several patches of successional old field lie between forested areas and farmland.
Jacobs Point-Luce Landing	Shallow concave sandy beach with bluffs ending at Luce Landing and town park; development along bluffs backed by several deep areas of mixed hardwood forests,with farmland to south; several fresh water ponds within forested areas southwest of Luce Landing. Offshore oil platform just north east of Jacobs Point.
Luce Landing-Captain Kidd Estates	Straight sandy beach backed by partially forested high bluffs to 100 ft; upland mixed hardwood forests, disturbance to vegetation east of Hallocks Pond caused by off road vehicles; several large lot homes with mowed lawn fragment forested upland; farmland south of forested and developed areas continues inland; linear home development with partially bulkheaded shoreline fronts sandy beach along Sound Beach Drive.
Captain Kidd Estates-Oregon Hills	Sandy beach interrupted by Mattituck Creek and Inlet, formed by jetty; deep water inlet, with strong tidal flushing, relatively

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	undisturbed salt marsh (Mattituck Inlet Wetland) at creek mouth; maritime shrubland communities behind beach and dune formation, vegetation grades to forests, topography rises to plateau of flat farmland. A mix of forested and developed areas border the creek and fringe of salt marsh. Along the southern bank of Mattituck Inlet, a former asphalt plant remains, with a portion of the shoreline bulkheaded; some vegetated areas remain east and west of the plant.
Oregon Hills-Duck Pond Point	Straight sandy beach with steep 100 ft bluffs rising to flat farmland.
Duck Pond Point-Goldsmiths Inlet	Shallow concave sandy beach with bluffs rising steeply to fringe mixed hardwood forest, interspersed by homes with mowed lawn close to the tops of the bluff, all backed by lightly developed countryside. Bulkheads and revetments constructed at the toe of the eroding bluffs.
Goldsmiths Inlet-Horton Point	Sandy beach and dune with maritime shrubland communities at Kenneys Road Beach and Horton Lane Beach. Long concave sandy beach extends from Goldsmith Inlet and widens to northeast; backed by dunes, salt marsh, ponds; heavy concentration of freshwater wetlands parallelling the beach, varied topography; some seasonal development. Deeper areas of mixed hardwood forests border the eastern perimeter of Goldsmith's Inlet. Goldsmith's Inlet County Park, used only for nature study, contains two brackish ponds, Salt marsh which grades to an upland of red cedar, and an area which contains pitch pine, white and black oak with an understory of with red maple. Backed by farmland and old field. East of Peconic Dunes County Park at Horton Point, narrow strip of mixed hardwood forest atop bluffs fragmented by large lot homes with mowed lawn. Backed by large blocks of forests, farmland and successional old field.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
Horton Point- Hashamomuck Beach (west)	Undulating concave sandy beach with large offshore rocks; vegetated bluff decreasing in elevation toward east to flat beach topography. Top of bluff developed with homes with mowed lawn. Toe protection at the base of bluff. Remnants of mixed hardwood forests atop bluffs, backed by large areas of successional old field and farmland. Remnant forested area just before substantial narrowing of watershed at Hashomomuck Beach. Seasonal development along beach.
Hashamomuck Beach (west)-Inlet Point	Hashamomuck Beach: Concave beach with some irregularity to west, backed by pond, saltmarsh and dunes, rising to east with moderate bluff. Narrow forested strip upland developed with homes and mowed lawns. Low sandy beach between the Sound and Hashamomuck Pond developed with homes with mowed lawn (some vegetation retained along the shorefront); large parking lots, tennis courts, condominium development with lawn area and boulder reinforced shoreline protection to east. Watershed widens south of Parker Rock. Large areas of mixed hardwood forests surround freshwater wetlands and open fresh waters at Inlet Pond, a brackish pond, separated from the Sound by a narrow strip of sandy beach with maritime shrubland vegetation, but which receives saline waters over-washed by severe northeast storms.
Inlet Pond-Rocky Point	Undulating concave sandy beach, strewn with boulders, regular bluff (bluff face vegetated) top of bluff developed with homes and mowed lawn; additional new home development is occurring; golf course, some forested areas remaining; backed by mixed hardwood forests, successional old fields and farmland.
Rocky Point-Trueman Beach (west)	Gently rising irregular sandy shoreline, backed by mixed hardwood forests and some development.

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SHORELINE DIVISION	SHORELINE DESCRIPTION
Trueman Beach (west)-Terry Point	Trueman Beach: Sandy barrier beach with maritime shrubland communities, backed by Dam Pond and Orient Harbor; some salt marsh along periphery of lagoons. Deep forested areas and successional old field border western perimeter of Dam Pond. Southern border contains an area of farmland and a lightly developed residential area. Eastern perimeter contains light residential development and is heavily treed.
Terry Point-Edwards Lane	Short concave beach backed by small ponds and irregular forested terrain.
Edwards Lane-Mulford Point	Irregular sandy beach backed by vegetated hills rising sharply form shore.
Mulford Point-Pettys Bight	Concave beach backed by flat uplands at low elevation; several offshore rocks with marine rocky intertidal communities.
Soundview Road-Orient Point	Sandy beach, backed by low bluffs, with maritime shrubland communities, extending into cobbly spit with several large boulders at Orient Point and reef.
DEEP OPEN WATER COMPLEX	
Plum Island	Plum Island large island offshore to the east of Orient Point, contains beaches backed by a variety of maritime dunes, mixed hardwood forests, lowlands with freshwater ponds and freshwater marshes. The island's offshore rocks support marine rocky intertidal communities. Little Gull and Great Gull Islands; two small rocky intertidal islands to the east of Plum Island. According to the Okeanos Ocean Research Foundation, the isolation from human activities provided by the islands in this complex facilitates their use as seal haulout areas.
FISHERS ISLAND COMPLEX	
Fishers Island & Hungry Point Islands	Offshore island with series of inlets, bays and beaches, marine intertidal mudflats and salt

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SHORELINE DIVISION	SHORELINE DESCRIPTION
	marshes, fronted by a variety of rocky shoreline, and offshore rocks with marine rocky intertidal communities; brackish marsh, red maple hardwood swamps, backed by rising wooded upland including a sunken forest and adjacent wooded area; (Fishers Island Beaches), undeveloped sand and cobble beaches backed by and interspersed with shrubs. Some human disturbance at the western end of Middle Farms Beach. Hungry Point Islands small undisturbed rock and salt marsh islands with concentrations of double-crested cormorants and wintering harbor seals.

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SHORELINE DIVISION	SHORELINE DESCRIPTION

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Appendix 3

Use Precluded and Use Impaired Long Island Sound Waters

The following tables present information on impairments to water quality of Long Island Sound coastal waters as the impairments affect use and enjoyment of those waters. The information was drawn from the Department of Environmental Conservation Priority Water Problem (PWP) listing. The listing is updated by the Department of Environmental Conservation biennially. It is a compilation of the various waters in the state which may exhibit adverse impacts from pollution, both point and nonpoint. Listing a waterbody does not imply eligibility for earmarked funds for remediation or pollution control. Rather, the list as a whole serves to indicate the extent and types of pollution affecting New York's waters. Currently, nearly 1,500 water bodies and stream segments in New York State are listed in the PWP, which recognizes four categories of use impacts: precluded, impaired, threatened, and stressed. "Used precluded" means that a water body does not meet the standards set for at least one of the beneficial uses (e.g., fish propagation, swimming, drinking water supply) for which the water body is classified. "Use impaired" means that there are some limits on one or more classified uses (e.g., swimming closed after heavy rainfall). "Use stressed" means that there are water quality reductions, and a use is marginally restricted. Finally, "use threatened" means that relevant conditions are such that use in the future may become limited.

The Long Island Sound contains a number of water bodies which are considered stressed or threatened. While these do not appear on the following tables which list priority water problems, it should be kept in mind that the condition of these water bodies may deteriorate if measures are not taken to improve their quality. It should also be noted that water bodies tributary to embayments of the Sound contribute to cumulative adverse effects on those embayments and to the Sound itself.

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Table 23 Use Precluded and Use Impaired Long Island Sound Waters, Westchester County

SEGMENT	PRIORITY	IMPAIRMENT	SEVERITY	CAUSES (Primary Cause underlined)
Long Island Sound off Westchester County	H	Shellfishing	Precluded	Municipal sewage, urban runoff, sewer overflows
Mead Pond	M	Fishing	Impaired	Urban runoff, Lawn chemicals
Milton Harbor	L	Boating	Impaired	Land clearing/development, urban runoff, bank erosion
Mamaroneck River	M	Aesthetics	Impaired	CSO, municipal and urban runoff, development
Sheldrake River	M	Fishing	Impaired	Unknown (chemicals and oils), CSO, urban runoff, storm sewers, bank erosion
Guion Creek	M	Aesthetics	Impaired	Urban runoff on-site disposal systems, bank erosion, development
Hutchinson River	M	Aesthetics	Impaired	Chemical leaks/spills, urban runoff, storm sewers, industrial
Lake Isle (Reservoir #1)	M	Bathing	Impaired	Lawn chemicals, urban runoff

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Table 24 Use Precluded and Use Impaired Long Island Sound Waters, New York City

SEGMENT	PRIORITY	IMPAIRMENT	SEVERITY	CAUSES (Primary cause underlined)
Hutchinson River	M	Fish propagatPre	Precluded	CSO, oil terminals
Lower East River	M	Fish propagatIon	Impaired	CSO, municipal
Harlem River	M	Fishing	Impaired	CSO, municipal
Newtown Creek	M	Fish survival	Precluded	CSO, boat pollution
East River Hells Gate to Whitestone Bridge	M	Fish propagation	Impaired	CSO, municipal, including hydraulic overflow at Wards Island STP
Bronx River	M	Aesthetics	Impaired	CSO, zoo runoff
Westchester Creek	M	Fishing	Impaired	CSO, dry weather overflows
Flushing Creek/Bay	M	Fishing	Impaired	CSO, municipal, contaminated sediments
Meadow Lake	H	Aesthetics	Precluded	Nutrient-rich sediments, urban runoff
Willow Lake	H	Aesthetics	Precluded	Nutrient-rich sediments, urban runoff
East River Whitestone Br to Throgs Neck Br	H	Bathing	Impaired	CSO, municipal
Eastchester Bay	M	Bathing	Impaired	CSO, municipal, land disposal
LIS, Throgs Neck Br. to Queens boundary	H	Shellfishing	Precluded	CSO, Urban runoff, boat pollution, municipal
Little Neck Bay	H	Bathing	Precluded	On-site waste disposal systems, CSO, urban runoff, boat pollution
Alley Creek	M	Fishing	Impaired	CSO

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Table 25 Use Precluded and Use Impaired Long Island Sound Waters, Nassau County

SEGMENT	PRIORITY	IMPAIRMENT	SEVERITY	CAUSES (Primary Cause Underlined)
Western Long Island Sound (30% of total area affected)	H	Shellfishing	Precluded	Urban Runoff, municipal, CSO, boat pollution
Manhasset Bay	H	Shellfishing	Precluded	Urban runoff, municipal, NYC CSOs
Leeds Pond	M	Bathing	Precluded	Storm sewers, urban runoff
Hempstead Harbor	H	Shellfishing	Precluded	Urban runoff, municipal, CSO
Oyster Bay Harbor (includes Mill Neck Creek)	H	Shellfishing	Precluded	Urban runoff, municipal, on-site waste disposal systems

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Table 26 Use Precluded and Use Impaired Long Island Sound Waters, Suffolk County

SEGMENT	PRIORITY	IMPAIRMENT	SEVERITY	CAUSES (Primary cause underlined)
Cold Spring Harbor	H	Shellfishing	Precluded	Urban runoff, storm sewers, on-site waste disposal systems
Huntington Bay	H	Shellfishing	Precluded	Urban runoff, on-site waste disposal systems, municipal, boat pollution
Smithtown Bay	H	Shellfishing	Precluded	Urban runoff
Nissequogue River	H	Shellfishing	Precluded	Storm sewers, on-site waste disposal systems
Stony Brook Harbor	H	Shellfishing	Impaired	Urban runoff, agriculture, waterfowl
Port Jefferson Harbor	H	Shellfishing	Precluded	Urban runoff, municipal, boat pollution, on-site waste disposal systems
Mount Sinai Harbor	H	Shellfishing	Precluded	Boat pollution, urban runoff
Goldsmiths Inlet	H	Shellfishing	Impaired	Urban runoff, on-site waste disposal systems
Mattituck Inlet	H	Shellfishing	Precluded	Urban runoff, on-site waste disposal systems, boat pollution
Millers Pond	M	Fishing	Impaired	Urban runoff, on-site waste disposal systems
Hashamomuck Pond	H	Shellfishing	Precluded	Urban runoff, on-site waste disposal systems
West Harbor	H	Shellfishing	Precluded	Urban runoff, boat pollution

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Appendix 4

Inventory of Waterfront Access, Recreation, and Open Space Facilities

The following tables describe the public waterfront access, recreation, and open space facilities for each community in the Long Island Sound coastal region. The name of the facility, the owner, the size of the facility, the presence or absence of residency restrictions, and the predominant use of the facility are presented in a west to east progression along the Sound coast.

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Table 27 Public Waterfront Access, Recreation, and Open Space, Westchester County

COMMUNITY	FACILITY	OWNER	AREA (Acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Village of Port Chester	Columbus Park	Village	10.68	None	Active and passive recreation
	William James Memorial Park	Village	0.3	None	Passive recreation
City of Rye	Disbrow Park and City Marina	City	52	Park use restricted to city residents. City Marina offers 20% non-resident membership.	Boat launch ramp, marina, passive recreation
	Rye Town Park and Beach	Town	67	Parking and beach use restricted to residents of City of Rye, Village of Port Chester, and parts of Town of Harrison.	Beach, bathhouse, passive recreation, fishing
	Playland Park	County	143	None	Amusement park, beach, fishing
	Playland Lake	County	220	None	Nature preserve, passive recreation
	Rye Town Dock and Boat Launch	Town	<1	None	Boat launch, jetty, fishing, parking
	Blind Brook Walkway	City	NA	None	Unimproved pathway along Blind Brook, passive recreation
	Marshlands Conservancy	County	250	None	Nature preserve, environmental education, trails, passive recreation-walking, nature study, photography
	Rye City Golf Club	City	136	Membership restricted to city residents, but limited number of non-resident memberships available	Golf club
Village of Mamaroneck	Harbor Island Park	Village	44	None, except permit required for field sports	Boat launch ramp, beach, fishing, courts, field games, passive recreation
Town of Mamaroneck	Hommocks Conservation Area	Town	5	None	Boardwalk provides waterfront access; passive recreation
	Premium River Conservation Area	Town	10	None	Passive recreation

Village of Larchmont	Flint Park	Village	27	Use of recreation facilities restricted to village residents	Recreational facilities; limited public access to waterfront due to leaf disposal site
	Woodbine Park	Village	1.41	None	Public access to Premium Marsh/Pine Brook
	Lorenzen Park	Village	3.39	None	Public access to Premium Marsh/Pine Brook
	Kane Park	Village	1.65	None	Public access to Pine Brook
City of New Rochelle	Five Islands Park	City	16.2	None	Fishing, nature preserve, playground, passive recreation
	Hudson Park	City	10	Seasonal restriction to city residents	Beach, bathhouse, bandshell, greenhouse and gardens, passive recreation, fishing
	Neptune Park	City	4.1	None	Horseshoe courts, fishing
	Leif Erickson Park	City	<1	None	Pocket park, visual access to city marina waters, monument
	Davenport Park	City	18.5	Restricted to city residents	Passive recreation, fishing
	Glen Island County Park	County	111	Seasonal restriction to county residents	Boat launch ramp, beach, picnicking, playfields, fishing
	Bird Sanctuary	City	2	No public use	Nature preserve
	Premium River/Pine Brook Wetlands	City	65	None	Passive recreation; also includes land in Town of Mamaroneck and Village of Larchmont
	Pryer Manor Marsh	City	5.25	None	Passive recreation
	Davids Island	City	120	No public use	No public use
Village of Pelham Manor	Shore Park	Village	40	Restricted to village residents	Passive recreation, soccer field

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Table 28 Private Waterfront Access, Recreation, and Open Space, Westchester County

COMMUNITY	FACILITY/OWNER	AREA (Acres)	PUBLIC ACCESS	USE DESCRIPTION
City of Rye	Shenorock Shore Club	NA	No	Private beach
	Coveleigh Club	NA	No	Private beach
	Westchester Country Club Beach Club	45	No	Private beach
	Manursing Island Club	8	No	Private beach
Village of Mamaroneck	Orienta Beach Club	9	No	Private beach
	Beach Point Club	21	No	Private beach
	Mamaroneck Beach and Cabana Club	12	No	Private beach
	Hampshire Country Club	112	No	Golf course
	Otter Creek Conservation Area	27	Yes, w/prior approval	Nature Conservancy property open on a restricted basis for passive recreation.
	Guion Creek	9	Yes	Informal public access. Managed by Town of Mamaroneck Conservation Committee.
Town of Mamaroneck	Winged Foot Golf Club	280	No	Golf course
	Bonnie Briar Country Club	148	No	Golf course
Village of Larchmont	Larchmont Manor Park	12.65	Yes	Passive recreation, trails and scenic overlook, private beach club for village residents
	Larchmont Shore Club	6.65	No	Private beach
City of New Rochelle	New York Athletic Club	36	No	Private beach and yacht club
	Davenport Neck Clubs	66	No	Private beach
	Huckleberry Island	10	No	Used by New York Athletic Club for boating, swimming and other recreational activities

Table 29 Public Waterfront Access, Recreation, and Open Space, New York City

COMMUNITY	FACILITY	AREA (Acres)	USE DESCRIPTION
East Bronx	Pelham Bay Park	2,764	Bathhouse, beach, hand boat launch, active/passive recreation, trails, nature preserve, fishing
	City Island Esplanade	NA	Fishing, walking
	Bicentennial Veteran's Memorial Park	9.26	Walkways, benches, lawn, Veteran's Memorial
North Queens	Alley Pond Park	654	Active/passive recreation, environmental education center, nature preserve, fishing
	Udalls Cove and Ravine	52	Nature preserve, passive recreation, trails
	Little Bay Park	50	Active/passive recreation, fishing
	John Golden Park	17	Active/passive recreation
	Crocheron Park	45	Active/passive recreation
	Shorefront parkland strip (unnamed) between Cross Island Parkway and Little Neck Bay	NA	Bicycle/pedestrian path, public boat launch (closed)

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Table 30 Public Waterfront Access, Recreation, and Open Space, Nassau County

COMMUNITY	FACILITY	OWNER	AREA (Acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Village of Great Neck Estates	Shore Drive Park	Village	12	Village residents only	Pool, courts, picnicking, off-shore docking, playground
Village of Great Neck	Harbor Hills Park	Town of North Hempstead	6	Harbor Hills Park District taxpayers only	Pool, boatslips, courts, playground
	Pond View Road Park	Great Neck Park District	7	Park district residents only	Pool, courts, field games, picnicking, playground
Village of Saddle Rock	Saddle Rock Gristmill and Museum	Nassau County	18	None	Field games, picnicking, hiking, museum
Village of Kings Point	Steppingstone Park	Great Neck Park District	10	Park district residents only	Fishing, launch ramp, slips, courts, field games, picnicking, playground, marine education center
Village of Kensington	East Shore Village Park	Village	6	Village residents only	Pool, field games, picnicking, playground
Manhasset	Manhasset Valley Park	Nassau County	27	None	Picnicking, field games, courts, swimming pool, walkways w/benches
Village of Plandome Manor	Leeds Pond Park	Town of North Hempstead	30	Town residents only	Picnicking
	Leeds Pond Park	Nassau County	35	None	Fishing, picnicking, hiking, nature walk, museum
Port Washington	North Hempstead Town Park	Town of North Hempstead	7	Town residents only	Fishing, boat slips, picnicking
Village of Baxter Estates	Sunset Park	Port Washington Water Pollution Control District	4	None	Fishing, field games, picnicking, playground, bandshell
Village of Port Washington North	Webster Park	Town of North Hempstead	2	None	Undeveloped shoreline
Village of Manorhaven	Manorhaven Beach Park	Town of North Hempstead	35	Town residents only	Beach, pool, boat launch ramp, field games, picnicking, roller and ice rink
Village of Sands Point	Sands Point Park and Preserve	Nassau County	216	None	Picnicking, hiking, nature walk, nature preserve, museum

Village of Port Washington	Hempstead Harbor Beach and Park	Nassau County	290	Nassau County Leisure Pass required	Beach, fishing, field games
	Bar Beach Park	Town of North Hempstead	34	Town residents only	Beach, fishing, boat launch ramp, field games, picnicking, playground
Village of Roslyn Harbor	William Cullen Bryant Preserve	Nassau County	141	None	Field games, picnicking, hiking, nature preserve, county fine arts museum
Glenwood Landing	Tappan Beach	Town of Oyster Bay	15	Town residents only	Beach, pool, boat launch ramp and slips, picnicking,playground
Village of Sea Cliff	Dock Hill Park	Nassau County	<1	None	Fishing, picnicking
	Shore Drive Park	Village	NA	Village residents only	Beach, boat launch ramp, boat rental, picnicking, playground
City of Glen Cove	Pratt Park and Mill Pond Preserve	City	8	None	Hiking, picnicking, fishing
	Paul Glaser Boat Ramp	City	<1	Free for city residents; fee for others	Boat launch ramp
	Garvies Point Museum and Preserve	Nassau County	62	None	Hiking, nature walk, museum
	Morgan Park	City	24	City and Locust Valley residents only	Beach, fishing, picnicking, hiking, nature walk
	Crescent Beach	City	1	City residents only	Beach, picnicking
	Welwyn Preserve	Nassau County	204	None	Picnicking, hiking, nature walk
	Prybil Beach	City	10	City residents only	Beach, picnicking
	Stanco Municipal Park and Golf Course	City	NA	City residents only	Golf course, picnicking
Village of Lattingtown	Village Beach	Village (leased from St. Josephat's Monastery)	4	Village residents only	Beach, fishing, picnicking, playground
	Oyster Bay National Wildlife Refuge	U.S. Fish and Wildlife Service	3117[1]	None	Hunting, fishing, boating, shellfishing
Village of Bayville/ Lattingtown	Stehli Beach	Town of Oyster Bay	10	Town of Oyster Bay residents only	Beach, picnicking

[1]Mostly underwater lands.

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Table 40 Public Waterfront Access, Recreation, and Open Space, Nassau County —*continued*

COMMUNITY	FACILITY	OWNER	AREA (Acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Village of Bayville	Ransom Beach	Town of Oyster Bay	5	None	Beach, picnicking, playground
	Bayville Anchorage (Creek Road Beach)	Village of Bayville	NA	Village residents only	Boat launch ramp
	Mill Neck Creek Conservation Area and Preserve	Nassau County	64	Nassau County residents only	Hiking, nature study
	Centre Island Beach	Town of Oyster Bay	60	Fee for non-residents	Beach, fishing, boat launch ramp, picnicking
	West Harbor Beach	Village	13	Village residents only	Beach, fishing, boat slips, field games, picnicking, playground
Oyster Bay	Beekman Beach	Town of Oyster Bay	6	Non-residents of Town permitted on weekdays only	Beach, picnicking
	Theodore Roosevelt Memorial Park and Beach	Town of Oyster Bay	43	Town of Oyster Bay residents only	Beach, fishing, boat launch ramp, boat slips, field games, picnicking, playground
Village of Cove Neck	Sagamore Hill National Historic Site	National Park Service	<90	None	Historic site, museum, picnicking

Table 31 Private Waterfront Access, Recreation, and Open Space, Nassau County

COMMUNITY	FACILITY/OWNER	AREA (acres)	PUBLIC ACCESS	USE DESCRIPTION
Village of Kings Point	Kings Point Pond and Preserve: The Nature Conservancy	14	Yes, w/ permission	Nature preserve
Port Washington	Port Washington Estates Beach Association	NA	No	Private beach club
Village of Sands Point	Bird Sanctuary-Village of Sands Point in process of verifying ownership	NA	Accessibility in question	Nature preserve
	IBM Country Club	NA	No	Private golf course
City of Glen Cove	Hempstead Harbor Club	NA	No	Private beach and yacht club
Village of Lattingtown	The Creek Club	NA	No	Private golf course

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Table 32 Public Waterfront Access, Recreation, and Open Space, Western Suffolk County

COMMUNITY	FACILITY	OWNER	AREA (acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Village of Lloyd Harbor	Lloyd Harbor Village Park	Village	37	Village residents only	Beach, field games, picnicking
	West Neck Beach	Town of Huntington	29	Town of Huntington residents only	Beach, small boat harbor, picnicking
	Cold Spring Harbor	Village	21	None, but no parking and accessible only to pedestrians	Fishing, passive recreation
	Lloyd Beach	Village	2.2	None, but no parking and accessible only to pedestrians	Fishing, passive recreation
	Village park	Village	2.6	Village residents only	Beach
	Caumsett State Park	State of New York	141	None	Fishing, hiking, picnicking, environmental education facilities
	Target Rock National Wildlife Refuge	U.S. Fish and Wildlife Service	78	None	Passive recreation
	East Beach Nature Preserve	Village	44	Permit only	Undeveloped village preserve
	East Beach	Town of Huntington	2.8	Boaters can use edge; remainder fenced off	Undeveloped nature preserve
Town of Huntington	Gold Star Battalion Beach	Town	9	Town residents only	Beach, small boat rack, picnicking, playground
	Mill Dam Boat Ramp and Marina	Town	6	Town residents served first for docking space	Launch ramp, boat slips
	Mill Dam Park	Town	5.5	Town residents served first for docking space	Boat slips
	Halesite Marina	Town	5.5	Town residents served first for docking space	Boat slips
	Halesite Park	Town	2	None	Fishing, field games, picnicking, playground
Village of Huntington Bay	Shore Road Beachfront Site	Village	>1	Village residents only	Beach, small sailboat launching from beach
	Crescent Beach	Town of Huntington	32.6	Town residents only	Beach, courts, playground

Centerport	Fleet Cove Beach	Town of Huntington	4.4	Town residents only	Beach, small boat rack, playground
	Adams and Harding Court Beach	Town of Huntington	6.3	Site used by Huntington Beach Club Association. Closed to general public.	Beach, picnicking, playground
	Centerport Beach	Town of Huntington	2	Town residents only	Beach, small boat rack, picnicking, playground
	Centerport Park	Town of Huntington	22.5	Town residents only	Picnicking, hiking
	Senior Citizens Beach	Town of Huntington	3	Town residents only	Beach, courts, picnicking, senior citizens activities
	Vanderbilt Museum and Planetarium	Suffolk County	43	None	Museum and planetarium, waterfront access
	Twin Ponds Park	Town of Huntington	18.2	Town residents only	Undeveloped parkland
Village of Northport	Scudder Park and Beach	Village	9.5	Village residents given first priority	Beach, boat launch ramp, picnicking, playground
	Cow Harbor Park	Town of Huntington	4	None	Fishing, field games, playground
	Village Park and Dock	Village	5.2	None	Boat slips, playground, small boat rack, bandstand
	Steers Beach South (Willow Beach)	Village	3.5	Village residents only	Undeveloped beach
	Steers Beach	Village	2.6	Village residents given first priority; fee for non-residents	Beach
Village of Asharoken	Asharoken Beach	Town of Huntington	5	Town residents only	Beach, small boat racks, courts
	Asharoken Ramp	Village of Asharoken	NA	Village residents only	Boat launch ramp
Eatons Neck	Hobart Beach	Town of Huntington	39	Town residents only	Beach, boat launch ramps, playground
Village of Asharoken	Asharoken Avenue Beach	Village	1	Village residents only	Undeveloped beach and marsh
	Nature preserve/bird sanctuary	Village	3.2	Village residents only	Preserve and sanctuary
	Soundview Boat Ramp	Town of Huntington	4.2	Town residents only	Boat launch ramps
Village of Northport	Beach at Waterview Street	Town of Huntington	13	Limited access to town residents only	Undeveloped beach
	Crab Meadow Beach	Town of Huntington	15	Town residents only	Beach, fishing, courts, picnicking, playground

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Table 42 Public Waterfront Access, Recreation, and Open Space, Western Suffolk County—*continued*

COMMUNITY	FACILITY	OWNER	AREA (acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Fort Salonga	Geisslers Beach	Town of Huntington	9	Town residents only	Beach, fishing, playground,
	Fresh Pond Park	Suffolk County	25.3	None-pedestrian access only	Undeveloped park-freshwater wetlands and pond system
	Callahans Beach Park	Town of Smithtown	15.2	Town residents only	Beach, fishing, picnicking, hiking
Kings Park	Sunken Meadow State Park	State of New York	126	None	Beach, picnicking, playground, golf, courts, field games, nature trail, fishing bicycle trail
	Old Dock Road Park	Town of Smithtown	4	Town residents only	Park and boat launch site
	Harrison Pond Park	Town of Smithtown	18	Town residents only	Passive recreation
San Remo	Smithtown Landing County Park	Suffolk County	93	None	Nature preserve, hiking, limited access
Smithtown	Nissequogue River Greenbelt	Suffolk County	34.8	None-pedestrian access only	Undeveloped park
	Caleb Smith State Park	State of New York	543	None	Nature trails, hiking, museum, fishing
	Paul T. Given Park	Suffolk County	9.2	None	Fishing, canoe boat launch ramp, picnicking
	Nissequogue River Greenbelt	Suffolk County	NA	None-pedestrian access only	Undeveloped park
	Landing Avenue Park	Town of Smithtown	4.1	None	Fishing, picnicking, playground
	Thatch Pond Park	Suffolk County	11.2	None-access by canoe only	Undeveloped park
	Nissequogue River Greenbelt	Town of Smithtown	2.5	None	Undeveloped greenbelt park
	Nissequogue River Greenbelt	Town of Smithtown	NA	None	Undeveloped greenbelt park
Village of Nissequogue	Short Beach park	Town of Smithtown	68.5	Town residents only	Beach, fishing, picnicking
	Long Beach Park	Town of Smithtown	64	Town residents only	Beach, fishing, boat launch ramp, boat slips, picnicking
	Shubert Beach (Little Africa Park)	Town of Smithtown	4.2	Town residents only	Beach, boat launch ramp, boat slips, picnicking, playground
	Nissequogue Village Beach and Wildlife Preserve	Village	NA	Village residents only	Wildlife preserve, passive recreation

Stony Brook	Town Boat Ramp	Town of Brookhaven	NA	Town residents only	Boat launch ramp
	Brookhaven Town Dock	Town of Brookhaven	NA	Town residents only	Boat launch ramp
	West Meadow Beach	Town of Brookhaven	31.2	None, but higher fee for non-residents	Beach, picnicking, playground
Village of Old Field	Flax Pond	State of New York	146.1	Access limited to NYSDEC and SUNY @ Stony Brook personnel only	Conservation area, marine laboratory
	Old Field Beach	Town of Brookhaven	5.4	Village of Old Field residents only	Undeveloped village beach
	Old Field County Bird Sanctuary	Suffolk County	23.5	Access for village residents and boaters	Undeveloped park
Village of Poquott	Setauket Dock	Town of Brookhaven	>1	Non-residents allowed but must pay higher fee	Beach and dock facility (landing float)
	Washington Avenue Beach (California Park)	Village	1.2	Village residents only	Beach, courts, picnicking
	Village Beach	Village	NA	Village residents only	Beach
Village of Port Jefferson	Village of Poquott Beach	Village of Poquott	NA	Village residents only	Beach
Village of Belle Terre	St. Orchard Road Waterfront Access Site	Village	1.4	Village residents only	Waterfront access
	McAllister County Park	Village	NA	None-boating access only	Undeveloped parkland
	Seaside Drive Beach	Village	4.3	Village residents only	Beach, fishing, playground
Village of Port Jefferson	East and West Beaches and Harbor Hills Golf Course	Village	125	Village residents only	Beach w/golf course

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Table 33 Private Waterfront Access, Recreation, and Open Space, Western Suffolk County

COMMUNITY	FACILITY/OWNER	AREA (acres)	PUBLIC ACCESS	USE DESCRIPTION
Village of Lloyd Harbor	Fiddlers Green Association, Inc.	6.1	No	Private beach
	Lloyd Neck Association, Inc.	4.6	No	Private beach
	Multiple private owners	NA	No	Private beach
	Hawk Hill Property Owners	2.1	No	Private beach
	Lloyd Harbor Association Beach Area-Lloyd Neck Association	2.5	No	Private beach
	Fiddlers Green Association, Inc	8.3	No	Private beach
	Mill Cove Waterfowl Sanctuary-The Nature Conservancy, Inc.	15.8	Yes, w/prior approval	Nature preserve
Huntington	Ridgefield Highlands Beach Club	NA	No	Private beach
Village of Huntington Bay	Nathan Hale Beach Club, Inc.	NA	No	Private beach
	Point Beach Association, Inc.	NA	No	Private beach
	Terra Mar Association, Inc.	NA	No	Private beach
Centerport	Huntington Beach Community Association	NA	No	Private beach
Village of Northport	Promenade Homeowners Association, Inc	NA	No	Private beach
	Saltaire Homeowners Association, Inc.	NA	No	Private beach
Village of Asharoken	Multiple private owners	NA	No	Private beach
Village of Northport	Sound Shore Bluffs Property Owners Association	NA	No	Private beach
	Water Side Park Association, Inc.	NA	No	Private beach
Fort Salonga	Indian Hills Country Club	NA	No	Private golf course
San Remo	San Remo Civic Association	NA	No	Private beach
Smithtown	Weld Preserve-The Nature Conservancy, Inc.	19.1	Yes, w/prior approval	Nature preserve

Village of Nissequogue	Multiple private owners	1	No	Private beach
	Nissequogue Beach Club-Nissequogue Point Beach Club	3.1	No	Private beach
	David Weld Sanctuary-The Nature Conservancy	113.8	Yes, w/prior approval	Nature preserve
	Wilderness Property Owners Association	NA	No	Private beach
	Nissequogue Country Club-Nissequogue Golf Club, Inc.	126.6	No	Private golf course
Village of Head of the Harbor	Stony Brook Community Fund-Stony Brook Gristmill and Mill Pond	21	Yes	Private historic site, park and pond
Village of Old Field	Old Field Beach Club-Old Field Club, Inc.	3.6	No	Private beach
Stony Brook	Sound View Association, Inc.	1.8	No	Private beach
	West Meadow Creek Wetlands-Stony Brook Community Fund	66	Limited	Nature preserve
Setauket	Frank Melville Memorial Foundation Park	20	Yes, before dusk	Nature preserve, passive recreation
Village of Poquott	Bayview Camping Association	1.2	Village residents only	Private beach and park

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Table 34 Public Waterfront Access, Recreation, and Open Space, Eastern Suffolk County

COMMUNITY	FACILITY	OWNER	AREA (Acres)	RESIDENCY RESTRICTIONS	USE DESCRIPTION
Mount Sinai	Crystal Brook Hollow Road Site	Village of Port Jefferson	1.8	Village residents only	Waterfront wetlands preserve
	NYSDEC Conservation Area	State of New York	5.7	None	Wetlands preserve
	Cedar Beach and Marina	Town of Brookhaven	53.3	None, but higher fees for non-residents	Beach, fishing, boat launch ramp, boat slips, playground
Miller Place	Cordwood Landing County Park	County of Suffolk	67	None	Nature preserve; passive recreation-hiking, nature study, photography, etc.
	Scotts Beach	Town of Brookhaven	15.6	None	Undeveloped beach
Village of Shoreham	Shoreham Village Park	Village of Shoreham	NA	Village residents only	Village park
East Shoreham	Village Beach and Park	Village of Shoreham	5	Village of Shoreham residents only	Beach, active recreation in park
	Town of Brookhaven Beach	LILCO-leased to Town of Brookhaven	5	None, but higher fee for non-residents	Beach
Wading River	Creek Road Boat	LILCO-leased to Town of Brookhaven	1.4	Town of Riverhead residents only	Boat launch ramp
	Wading River Beach	Town of Riverhead	1.2	Town of Riverhead residents only	Beach, fishing, playground
	Wildwood State Park	State of New York	738.2	None	Beach, camping, picnicking, courts, playground, hiking, fishing
Baiting Hollow	Baiting Hollow Wetlands	State of New York	77.1	None; access by permit only	Passive recreation
Roanoke	Reeves Beach	Town of Riverhead	13.6	Town of Riverhead residents only	Beach, fishing, boat launch ramp
Roanoke	Roanoke Point Beach	Town of Riverhead	1.6	Town of Riverhead residents only	Beach, fishing, boat launch ramp
Northville	Iron Pier Beach	Town of Riverhead	16.6	None, but fee for non-residents	Beach, fishing, boat launch ramp, playground

Mattituck	Mattituck Inlet Park	Mattituck Park District	40	Mattituck Park District residents only	Beach, fishing, boat launch ramp, playground
	Town of Southold Boat Launch Ramp	Town Of Southold	NA	Town residents only	Boat launch ramp
	Mattituck Park District Marina	Mattituck Park District	NA	Mattituck Park District residents only	Boat launch ramp
	NYSDEC Conservation Area	State of New York	28.1	None: access by permit only	Nature preserve
East Mattituck	Goldsmith Inlet Beach	Town of Southold	2	Town of Southold residents only	Beach
Peconic	Goldsmith Inlet County Park	Suffolk County	34	None	Undeveloped park w/nature trails
	Peconic Dunes County Park	Suffolk County	36	Open only to school classes	Nature preserve; ecological and environmental study by students
Southold	Kenny's Road Beach	Town of Southold	5	None, but higher fees for non-residents	Beach, fishing
	Horton Lane Beach	Town of Southold	2.2	None, but higher fees for non-residents	Beach, fishing
	Horton Point	Southold Park District	8.8	Southold Park District residents only	Lighthouse, park district museum, waterfront access site
	Hashomomuck Beach	Town of Southold	6	None, but higher fees for non-residents	Beach, fishing
Village of Greenport	Clarkes Beach	Village of Greenport	15.3	NA	Undeveloped park and beach
	Inlet Point County Park	Suffolk County	33	None	Undeveloped park; passive recreation-hiking, nature study, photography, etc.
Stirling	Sound Road Beach	Town of Southold	2	None, but higher fee for non-residents	Beach, fishing
Orient	Truman's Beach	Leased to Orient-East Marion Park District	20	Park district residents and motel guests only	Beach, boat launch ramp, fishing
	Orient Point County Park	Suffolk County	48.5	None	Undeveloped park
Fisher's Island	Fisher's Island Public Ramp	Town of Southold	NA	Town residents only	Boat launch ramp

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Table 35 Private Waterfront Access, Recreation, and Open Space, Eastern Suffolk County

COMMUNITY	FACILITY/OWNER	AREA (Acres)	PUBLIC ACCESS	USE DESCRIPTION
Miller Place	Miller Woods Beach Club	>1	No	Private beach
	Scotts Beach Club, Inc	>1	No	Private beach
Sound Beach	Sound Beach Property Owners Association	8.6	No	Private beach
	Tides Property Owners Association	6.2	No	Private beach
Rocky Point	Terraces on the Sound Property Owners	NA	No	Private beach, camp
	North Shore Beach Property Owners Association	NA	No	Private beach
Village of Shoreham	Shoreham Country Club	NA	No	Private golf course
East Shoreham	Shoreham Shore Club, Inc.	9	No	Private beach
	Soundview at Shoreham-Sound Property Owners Association	1.4	No	Private beach
	Shoreridge Hills Association, Inc.	6.4	No	Private beach
Wading River	Wading River Beach Club, Inc.	NA	No	Private beach
	Wading River Marsh-The Nature Conservancy	98.6	Yes, w/prior approval	Nature preserve
	Wildwood Shores Estates Civic Association	NA	No	Private beach
	Oakwood on the Sound, Inc.	NA	No	Private beach
Baiting Hollow	Flagg Country Club	273.9	No	Private golf course
Roanoke	Nassau County 4-H Camp	137.9	No	Camp
Northville	Nassau County Police Boys Club	23.2	No	Camp
Mattituck	Heather Hills on the Sound	>1	No	Private beach
	Brown's Woods Association, Inc.	NA	No	Private beach
East Mattituck	Birch Hills Property Owners	1	No	Private beach
Stirling	Islands End Golf and Country Club	136.5	No	Private golf course
	Pebble Beach Farms Lot Owners Association	NA	No	Private beach

East Marion	Aquaview Property Owners Association	NA	No	Private beach
	East Marion Stars Beach Association	NA	No	Private beach
Orient	Petty's Bight Association, Inc.	1.1	No	Private beach
	Orient By the Sea Property Owners	1.1	No	Private beach
	Port of Egypt Orient, Inc.	1.7	No	Private beach
Fishers Island	Hay Harbor Club Golf Course	44.6	No	Private golf course
	Isabella Beach	6.1	No	Private beach
	Chocomount Beach	NA	No	Private beach
	The Nature Conservancy	12.7	Yes, w/prior permission	Nature preserve
	Fishers Island Country Club and Golf Course	95	No	Private golf course

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Northeast Coastal Area Study
Significant Coastal Habitats
Site 2 (NY)

I. **SITE NAME:** Three Harbors Area

II. **LOCATION**: This major habitat complex of deep glacial bays and harbors and associated uplands, coastal beaches and wetlands is located on the north shore of Long Island along the shoreline of western Long Island Sound. The area is bisected by the Nassau-Suffolk County line.

TOWNS: Huntington, Oyster Bay
COUNTIES: Nassau, Suffolk
STATE: New York

USGS 7.5 MIN QUADS:	Huntington, NY	40073-74
	Hicksville, NY	40073-75
	Northport, NY	40073-83
	Lloyd Harbor, NY-Conn	40073-84
	Bayville, NY-Conn	40073-85
USGS 30X60 MIN QUAD:	Long Island, West	40073-E1

III. **GENERAL BOUNDARY**: The delineated area in the accompanying map extends from Oak Neck Creek, near Bayville, in the Town of Oyster Bay, Nassau County, east of Northport Bay and Crab Meadow in Huntington, Suffolk County, an east-west linear distance if approximately 14 miles (23 km). The greatest distance for this complex in a north-south direction, of from the coast inland, is approximately 8 miles (13 km.). The area includes the adjacent nearshore waters of western Long Island Sound out to a depth of approximately 30 feet (9 meters), and, from west to east, the following protected and semi-enclosed water bodies: Mill Neck Creek, Oyster Bay, Oyster Bay Harbor, Cold Spring Harbor, Lloyd Harbor, Huntington Bay, Northport Bay and several smaller embayments, harbors and tidal creeks. Associated uplands consist of three major "necks" of land jutting prominently into Long Island Sound - Oak Neck, Lloyd Neck and Eatons Neck - and several relatively smaller "necks" within the bays, specifically Mill Neck, Cove Neck, West Neck, East Neck and Little Neck.

IV. **OWNERSHIP/PROTECTED STATUS:** The area contains two National Wildlife Refuges (Oyster Bay and Target Rock), Sagamore Hill National Historic Park, several State, County and Town parks and beaches (Crab Meadow, Theodore Roosevelt Memorial Park, Caumsett State Park, Planting Fields State Park, etc.) and smaller preserves owned by private conservation organizations such as the Nature Conservancy, National Audubon Society and local Land

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Trusts. The vast majority of the total area, however, is a combination of Public Trust waters and private lands.

V. **GENERAL HABITAT DESCRIPTION:** Habitat diversity in this area is relatively high, ranging from rich, dense upland forests and marshy lowlands to open bay and sound waters and sand beaches. Human development is prominent and extensive over much of the terrestrial landscape. The primary areas of significant fish and wildlife habitat are open bay waters, wetlands and undeveloped beaches. The entire complex is drained by the Oyster Bay and Huntington Bay drainage basins. The majority of open waters of the larger bays range form 6 to 30 feet (2-9 meters) below mean low water in depth, with maximum depths of 50-70 feet (15-21 meters). Tidal fluctuation is approximately 7 feet (2 meters) in this area. Elevations along the shore range from sea level to 60 feet (18 meters) or more on the bluffs and even higher in the interior of the "necks" and at the heads of the harbors. Although salt marshes, mudflats and beaches line sections of shoreline, much of the area is bordered by residential development ranging from large, sparsely-developed estates to densely-populated communities and heavily-used marinas. There are a few important areas of relatively undisturbed salt marshes, dominated by saltmarsh cordgrass (*Spartina alterniflora*) and saltmeadow cordgrass (*S. patens*), although total acreage is not very extensive. Narrow, sparsely vegetated sand, gravel and cobble beaches are found on several of the spits, shorelines and small islands in and along the bays. Bottom sediments in Long Island in this nearshore area are predominantly coarse sands and gravels, like the beaches. Red maple (Acer rubrum) swamps are common and relatively well-developed in the area. Upland forests range from rich deciduous slope forests of tulip poplar (*Liriodendrum tulipifera*), red oak (*Quercus rubra*) and spicebush (*Lindera benzoin*) to dry morainal woodlands of chestnut oak (*Quercus prinus*) and mountain laurel (*Kalmia latifolia*).

VI. **SIGNIFICANCE/UNIQUENESS OF AREA:** The open waters of the major embayments of Northport Bay, Oyster Bay, Lloyd Harbor and Cold Spring Harbor contain regionally significant concentrations of wintering and migrating waterfowl, particularly spices of special emphasis in the region such as greater scaup (*Althya marila*), American black duck (*Anas rubripes*), American wigeon (*Anas americana*), canvasback (*Aythya valisineria*), red-breasted merganser (*Mergus serrator*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*) and oldsquaw (*Clangula hyemalis*). From year to year, use of these bays by wintering waterfowl is influenced in part by the extent of ice cover. These bays are also highly productive marine shellfish and finfish areas. Oyster Bay and others in this area are among the most important oyster-producing waters in New York State, if not the region. American oysters (*Crassostrea virginica*) are generally found in waters greater than 6 feet (2 meters) in depth, and many of these underwater beds are leased for commercial harvest. Hard-shelled clams (*Mercenaria mercenaria*) are also abundant in this area and are harvested both commercially and recreationally. These bays also serve as important nursery and feeding areas (April - November) for scup (*Stenotomus chrysops*), bluefish (*Pomatomus saltatrix*), Atlantic silverside (*Menidia menida*), menhaden (*Brevoortia tyrannus*), winter flounder (*Pseudopleuronectes americanus*), striped bass (*Morone saxatilis*) and blackfish (*Tautoga onitis*). Winter flounder occur throughout the year, spawning during the winter months (January - March), and

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are one of the most abundant fisheries resources in the bays. In addition to shellfish and finfish, these bays may also be important feeding habitat for juvenile Kemp's ridley sea turtles (*Lepidochelys kempil*), a U.S. Endangered species, although more data are needed to document the extent of habitat use by this and other sea turtle species, including loggerhead (*Carretta caretta*). Large numbers of Northern diamondback terrapin (*Malaclemys t. terrapin*) have been observed in these waters, and nesting is know to occur here.

Important wetlands, especially salt marshes, of this complex include those at Mill Neck Creek, Oak Neck Creek, Lloyd Point and Crab Meadow, the latter being one of the few large areas of undeveloped salt marsh remaining on the north shore of Long Island. These are extremely valuable areas for many wetland associated species of birds, especially as feeding areas for waterfowl, wading birds, gulls, terns and shorebirds. Known or probable breeding birds of special regional emphasis include green-backed heron (*Butorides striatus*), black-crowned night-heron (*Nycticorax nycticorax*), snowy egret (*Egretta thula*), clapper rail (*Rallus longirostris*), American black duck, and least bitten (*Ixobrychus exilis*). Wintering bald eagles (*Haliaeetus leucocephauls*), a U.S. Endangered Species, have also been reported using these areas in recent years. Ospreys (*Pandion Haliaetus*) neat and feed in these areas.

Several undeveloped sand and pebble beaches in the eastern portion of this complex are important nesting areas for piping plover (*Charadrius melodus*), a U.S. Threatened species, common tern (*Sterno hirundo*) and least tern (*S. antillarum*), including one of the largest colonies in New York State of the latter. The more significant areas are beaches at Target Rock, Lloyd Point, Eatons Neck Point and Sand City (West Beach). Population levels vary from year to year based on a number of factors, foremost of which is human-related disturbance during the critical nesting period (mid-April to August).

VII. **THREATS:** The area's fish and wildlife populations are under considerable pressure from shoreline and upland development and recreation. The value of open water and benthic (bottom) bay and sound habitats to waterfowl, finfish and shellfish is threatened by contaminants, oil spills, suburban runoff, excessive sedimentation, sewage and stormwater discharges, waste disposal, dredging activities and construction of shoreline structures. These waters are subject to low oxygen levels (hypoxia) during the summer months which, when prolonged, can stress and even kill marine organisms. Wetland habitats are additionally threatened by ditching, draining and filling activities not specifically designed or intended to enhance the fish and wildlife values of these habitats. Piping plovers and terns are extremely vulnerable to human disturbance, both from off-road vehicles and pedestrians, during the nesting season, which can lead to seasonal or even permanent abandonment of the beach sites. Predators, especially dogs, cats and rats, can be destructive to the beach nesting colony and are clearly a major problem in some, if not most, areas. Nesting beaches as well as adjacent marsh and tidal flat feeding areas are potentially threatened by unregulated dumping of dredge spoils or by shoreline structures that might accelerate beach erosion.

VIII. **CONSERVATION CONSIDERATIONS:** With regard to open water and benthic habitats on the large bays and nearshore environments of Long Island Sound,

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specifically as it applies to the conservation of waterfowl, marine turtles, finish and shellfish dependent upon these areas, appropriate protective measures should be taken. Regulation, zoning, planning or cooperative management agreements should be pursued to ensure the achievement and maintenance of a high level of water quality and to protect such areas form the hazards of chemical and sewage pollution and sediment discharges. Harvests of all commercially and recreationally exploited species need to be closely monitored to ensure that optimum sustainable populations are maintained over the area. Disturbances to wintering concentrations of waterfowl in these areas from whatever source should be minimized. Beach habitats of nesting piping plovers and terns are highly vulnerable to a variety of human-related disturbances and stringent protective measures are necessary throughout the critical nesting and young-rearing priopredator removal, warden patrols and public education. Applicable objectives and tasks of the piping plover recovery plan should be implemented, whenever possible. Protection of specific tracts or sites, particularly those significant sites identified on the accompanying map, can be accomplished by a variety of mechanisms ranging from easements and cooperative agreements, zoning and land-use regulations, planning, tax incentives, mutual covenants and land exchanges to acquisition. The Three Harbors Complex offers an abundance of creative land resource conservation opportunities and challenges involving the cooperative effort of Federal, State, County and local governments in partnership with private conservation organizations such as The Nature Conservancy, National Audubon Society and various local Land Trusts, and, most importantly, private landowners.

BW038407

MAP

BW038408

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Northeast Coastal Areas Study
Significant Coastal Habitats
Site 4 (NY)

I. **SITE LOCATION:** Port Jefferson - Stony Brook Harbor Complex

II. **LOCATION:** This area of protected harbors and adjacent uplands and wetlands is located along the north shore of central Long Island, in the vicinity of the villages of Port Jefferson and Stony Brook.

TOWNS: Brookhaven, Smithtown
COUNTY: Suffolk
STATE: New York

USGS 7.5 MIN QUADS:	Port Jefferson, NY	40073-81
	Saint James, NY	40073-82
USGS 30x60 MIN QUAD:	Long Island, West	40073-E1

III. **GENERAL BOUNDARY:** The boundary of this barrier beach and protected harbor complex, as delineated on the accompanying map, extends form Long Beach and the western shoreline of Stony Brook Harbor, between the Villages of Nissequogue and Stony Brook, along the coast in a northerly and then easterly direction to the eastern shoreline of Mt. Sinai Harbor, 1 mile (2 km) northeast of the Village of Port Jefferson. The individual embayment and beach units of significance to fish and wildlife within this complex are, from west to east: Long Beach, Stony Brook Harbor, West Meadow Flax Pond, Old Field Beach, Conscience Bay, Little Bay, Setauket Harbor, Port Jefferson Harbor, McAllister County Park Beach, White Beach, and Mt. Sinai Harbor. The breadth of this complex, from southwest to northeast, is approximately 10 miles (16 km) across. The shoreward (inland) boundary is mostly confined to the immediate coastline and embayed areas and rarely extends more than 2 miles (3 km) inland, and this only in a few harbors.

IV. **OWNERSHIP/PROTECTED STATUS**: Most of the waters and wetlands are publicly-owned (State, County, Town) while ownership of some of the beach areas is mixed public and private property.

V. **GENERAL HABITAT DESCRIPTION:** The barrier beaches in this complex (Long Beach, West Meadow Beach, Flax Pond Beach, Old Field Beach, McAllister County Park Beach and White Beach) contain several undeveloped areas consisting of sparsely vegetated sand, gravel and cobble beaches and sand dunes along the shore of Long Island Sound, with some areas of dredging spoil deposits. Typical vegetation includes beachgrass (*Ammophila brevligulata*) and seaside goldenrod (*Solidago sempervirens*). Except for Port Jefferson Harbor, which ranges in depth form 6 to 30 feet (2-9m), with a maximum of over 50 feet (15m), most of the bays and harbors in this complex are shallow (less than 6 feet (2m) in depth) and contain extensive tidal mudflats. Tidal fluctuation in these bays is approximately 7 feet (2m). The shoreline of these bays varies from having fairly extensive tidal salt marshes, such as in Stony Brook Harbor, West Meadow, Mt. Sinai Harbor and Flax Pond, to heavy residential development, as in portions of Setauket Harbor.

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VI. **SIGNIFICANCE/UNIQUENESS OF AREA:** The open waters of the harbors and bays of this complex are of regional significance as winter concentration areas and migration resting areas for waterfowl, particularly for several regional species of special emphasis such as American black duck (*Anas rubripes*), lesser and greater scaup (*Aythya affinis* and *A. marilla*, respectively), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), canvasback (*Aythya valisineria*), oldsquaw (*Clangula hyemalis*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), American wigeon (*Anas americana*) and red-breasted merganser (*Mergus serrator*). Waterfowl use of these bays and harbors in winter is influenced, in part, by the extent of ice cover in any given year. These embayments are also used for nesting by American black duck, Canada goose, green-backed heron (*Butorides striatus*), black-crowned night-heron (*Nycticorax nycticorax*), snowy egret (*Egretta thula*)and great egret (*Casmerodius albus*), with a major wading bird rookery located on the east end of Long Beach.

The waters of these areas are also extremely productive shellfish and finfish nursery and spawning areas, especially for winter flounder (*Pseudopleuronextes americanus*), bluefish (*Pomatomus salatrix*), blackfish (*Tautoga onitis*), Atlantic silverside (*Menidia menidia*), hard-shelled clam (*Mercenaria mercenaria*), soft-shelled clam (*Mya arenaria*), and American oyster (*Crassostrea virginica*). There are indications that some of these bays may be used by juvenile Kemp's ridley (*Lepidochelys kempii*), a U.S. Endangered Species and one of the most rarest sea turtles, through the extent of use and significance of these areas to this and other sea turtle species is not well known.

The barrier beaches in this complex obtain significant nesting colonies of piping plover (*Charadrius melodus*), a U.S. Threatened species, least terns (*Sterna antillarum*) and common terns (*Sterna hirundo*), although numbers are variable from year to year, probably due to disturbance during the nesting period. Flax Pond is the site of several important research studies and there is a New York State Department of Environmental Conservation research station at this site. In addition, the barrier beaches at Flax Pond and Old Field Beach are designated under the national Coastal Barrier Resources Act.

VII. **THREATS:** Residential and commercial marina development, including channel dredging and construction of shoreline structures, in the coastal watershed and harbors of this complex is of concern as regards water quality in these embayments. Fortunately, a considerable portion of the shoreline in these areas is relatively undeveloped and still contains substantial marsh and mudflat habitat and undeveloped woodlands on the upland margins. Beach habitats are under tremendous recreational pressure in this complex, resulting in human disturbances to nesting terns and piping plovers by boat-landings, picnicking, trampling of eggs and nests, and unleashed pets. In some cases this may have led to nest abandonment or reduced breeding success.

VII. **CONSERVATION CONSIDERATIONS:** Improvements and protection of water quality in the embayments and nearshore waters should be given high-priority management focus to ensure the continued long-term value of this area for fish and wildlife populations of regional importance, particularly for wintering waterfowl, shellfish beds, spawning and juvenile finfish, and colonial beach-

BW038411

nesting birds. Disturbances by human and pets to beach-nesting colonial birds and wading bird rookeries is of major concern and should be prevented. Methods to be applied include protective fencing and enclosures, posting, warden patrols, predator/pet removal and public education. Efforts should be made to implement objectives and tasks outlined in the piping plover recovery plan that may be applicable to beaches in this complex, including habitat improvement and enhancement actions. Cooperative management and conservation agreements may need to be developed among the various governmental agencies and landowners to protect not only beach nesting areas, but marsh nesting species and wintering waterfowl concentrations. Opportunities should also be sought to enhance wetland habitats in support of the North American Waterfowl Management Plan-Atlantic Coast Joint Venture.

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MAP

BW038414

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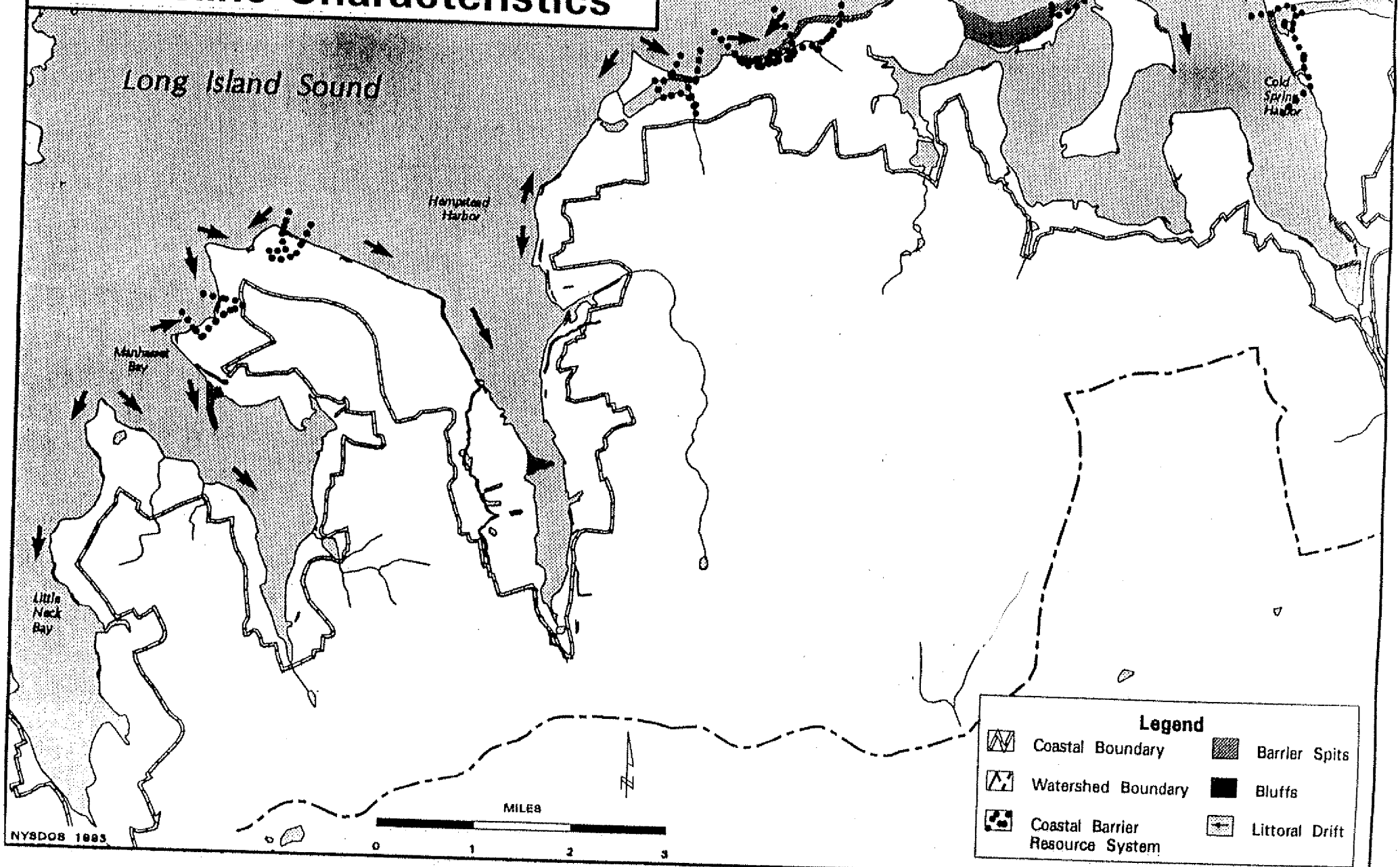
Nassau County Shoreline Characteristics

MAP 7.2



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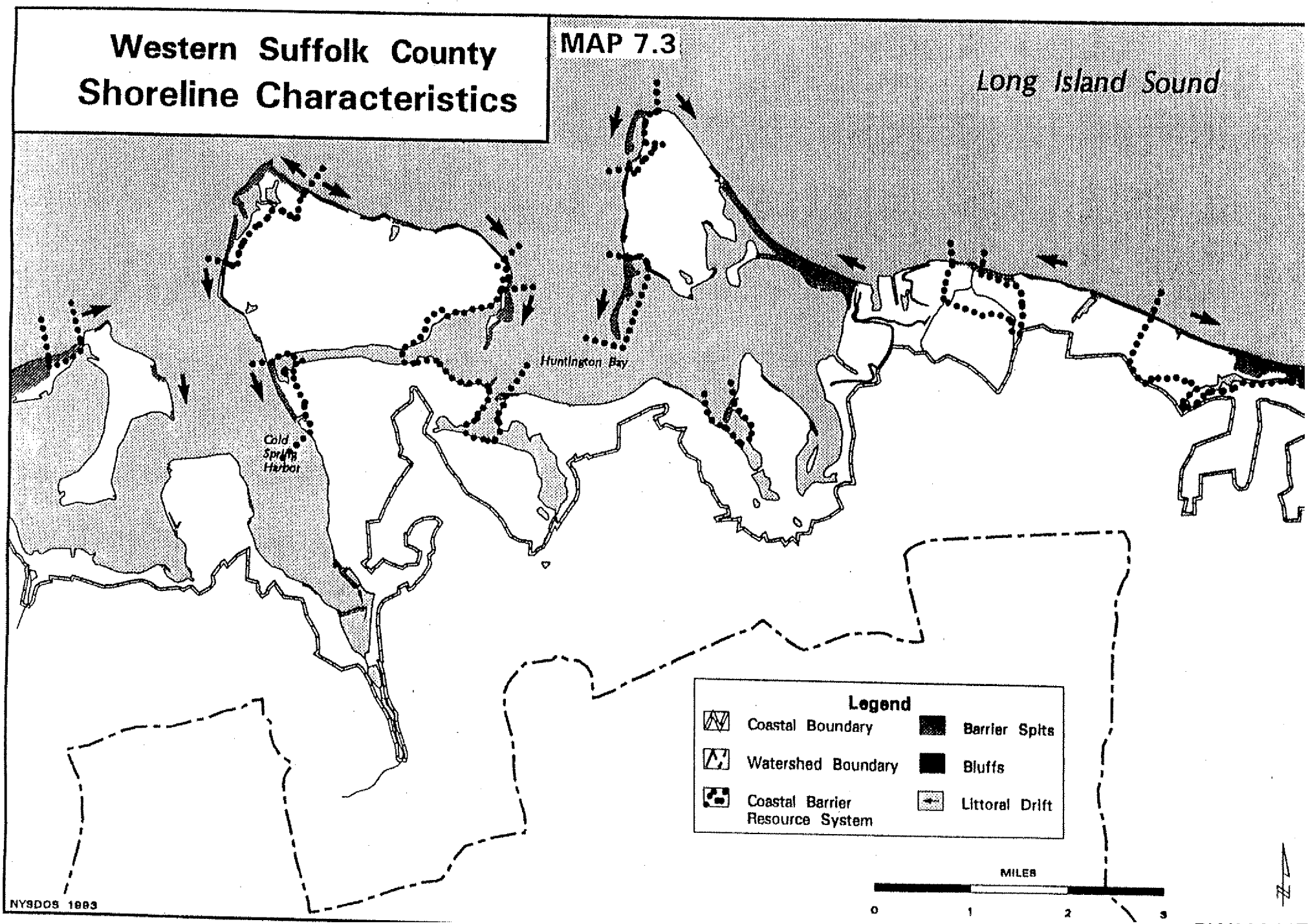
Western Suffolk County
Shoreline Characteristics
MAP 7.3
Long Island Sound
Huntington Bay
Cold Spring Harbor
Legend
Coastal Boundary
Watershed Boundary
Coastal Barrier Resource System
Barrier Spits
Bluffs
Littoral Drift
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Excerpt from the Northeast Coastal Areas Study regarding the selection of Significant Coastal Habitats.

I. INTRODUCTION

The coastal and estuarine area of southern New England and northern and eastern Long Island is characterized as an extensive and diverse interconnected system of sounds, bays, lagoons, coves, harbors, coastal streams, tidal rivers and shorelands extending form the western Narrows of Long Island Sound to the islands of Monomoy and Nantucket South of Cape Cod, Massachusetts and south to Montauk Point, New York. (See Map, Appendix A). This broad mixing zone of seawater and freshwater lying between the Atlantic Ocean and the coastal shorelands of Connecticut, Rhode Island, Massachusetts and New York, has been historically renowned for its rich fisheries, abundance of waterfowl, diverse wildlife, protective marshes, scenic beaches, and outstanding recreational opportunities. It has also been an area of unprecedented human population growth and massive urban coastline development that in recent decades has resulted in dramatic declines in its living resources and the large-scale loss and degradation of essential estuarine and coastal habitats. The extinction and expiration of several species of plants and animals in this area and population declines of others, and consequent biological diminution of the region, can be attributed to many factors, but most prominent are the destruction of natural habitats through dredging, filling, ditching, and draining of wetlands, highway and building construction, and pollution of sediments and waters by environmental contaminants such as chlorinated hydrocarbons, heavy metals, nutrients associated with various human activities and oil. Other factors include overharvesting, intensive recreational use of shoreline beaches and expanding populations of certain nuisance species and their competitive displacement of other species.

Congress, in recognizing the biological and economic importance of the living resources and natural values of the Northeast coastal area both to the region and the Nation as a whole, appropriated $150,000 in FY 1990 for the Fish and Wildlife Service (Service) to conduct a study that would identify those areas in southern New England and Long Island in need of protection for fish and wildlife habitat and the preservation of natural diversity. Specifically, the House Appropriation Committee directed that:

> *The $150,000 provided for a study of the coastal areas of Southern New England and Long Island, New York, includes, but is not limited to, Long Island Sound, Great Peconic Bay, Rhode Island Sound, Narragansett Bay, Buzzards Bay, Nantucket Sound, and the Lower Connecticut River. The study shall include an inventory of the natural values of these areas and subsequent identification of areas in most need of protection for fish and wildlife habitat, endangered species habitat, migratory waterfowl values, and the preservation of biological diversity. The Committee expects the Service to report its findings by March 1, 1990.*

This final report, prepared in response to the above Congressional directive, outlines the geographic scope of the project as well as the methodologies used to delineate the study area boundary and to identify coastal species and habitat types included in the inventory. The major focus of this document is a compendium and individual description of regionally significant habitats and habitat complexes in need of protection. The list of habitat areas was developed after extensive consultation with regional biologists in the Federal and State governments and numerous organizations and universities. Nevertheless, differences in interpretation may exist among regional biologists and land

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managers as to what constitutes "significance" or "importance" and to what extent an area may be viewed as needing protection. As used in this report, "significance" of a site or resource refers to its relative regional importance to one or more life history stages or seasonal use periods of Federal trust species, defined in Section III-B and listed in Appendix B, and is not meant to infer any statistical level of significance or quantitative ranking system. For example, the presence of a population, regardless of size, of a U.S. Endangered or Threatened Species, the occurrence of exemplary and undisturbed stand of a regionally scarce community type, a large wintering concentration of waterfowl in numbers or densities considerably greater that what is generally encountered in the region, areas with a high diversity of trust species, a highly vulnerable breeding or spawning area of a fish or bird species that has been substantially reduced or qualitatively degraded from historical times, may all be considered "regionally significant" sites or resources in this report. Periodic re-evaluation of the data and criteria presented will be valuable in maintaining the usefulness of this document.

It is important to note that recommendation for protection that are provided in this report are for planning purposes and do not represent a budgetary commitment, particularly for acquisition, by the Department of the Interior to this project. Any increase above the President's Budget request will need to be offset by corresponding reductions on other projects or programs so that deficit reduction targets can be met. In addition, these areas have not yet been nationally evaluated by the Service in accordance with its Land Acquisition Priority System. Many of the ares identified in this report are already being managed to one degree or another for conservation purposes and are acknowledged here not only for their individual value to fish and wildlife resources but as being part of more extensive habitat complexes requiring a consistent management approach at the ecosystem level.

II. SCOPE OF PROJECT

The study area includes three priority estuaries under the EPA's National Estuary Program: Narragansett Bay, Buzzards Bay and Long Island Sound. Each of these Estuaries of National Significance is currently being assessed by a cooperative effort involving Federal, State, interstate and local agencies, as well as research institutions, educational organizations and citizen's groups. Peconic Bay, at the eastern end of Long Island (NY) in the study area, is in the process of being added to the list of priority estuaries by the EPA. This area is also of considerable interest to the State of New York and the Nature Conservancy as a potential bioreserve. (Briefly, The Nature Conservancy defines a bioreserve as an area having an integrated landscape with naturally functioning ecological processes, and containing outstanding examples of ecosystems, natural communities, and spices which are endangered or inadequately protected.)

The Fish and Wildlife Service temporarily established the Northeast Estuary Office in Charlestown, Rhode Island, in January 1990, to conduct and direct the study. Collocated with the Ninigret National Wildlife Refuge, this office is part of the Service's Northeast Coastal and Estuary Program in Region 5. The Service is proposing to establish the office as a permanent station in FY to implement the study and to participate in the ongoing EPA National Estuary Program.

The project has worked closely with The Nature Conservancy's Northeast Regional Office and State chapters, and Natural Heritage Programs for the states of Massachusetts, Rhode Island, Connecticut, and New York. Other essential cooperators have included the various State natural resource agencies and universities in the four-state area and the

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following Federal agencies: Environmental Protection Agency (EPA), National Marine Fisheries Service, National Ocean Service, National Park Service and various divisions, research centers and programs within the Fish and Wildlife Service. The National Audubon Society provided substantial technical assistance regarding certain geographical areas.

The FY 90 House Appropriation Committee language originally directed the Service to complete the present study and submit a final report by March 1990. At the request of the Service the Committee agreed to extend the due date for the final report to March 1991. An interim report was prepared and submitted to the Congress on July 25, 1990, that provided summary information on the status of the project to date as well as a preliminary identification and description of regionally significant fish, wildlife and plant habitats in need of protection. Subsequent yo that, the Service requested and received form Congress an additional three-month extension of the report's due date.

III. METHODOLOGY

A. Delineation of Study Area Boundary:

The House Appropriations Committee described the study area as "...to include, but not be limited to: Long Island Sound, Great Peconic Bay, Rhode Island Sound, Narragansett Bay, Buzzards Bay, Nantucket Sound and the lower Connecticut River." Following this general guidance, the Service determined that the study area as encompassing the sounds, bays, estuaries, tidal rivers and adjacent shorelands from Nantucket Sound, including the islands of Mononmoy, Nantucket and Martha's Vineyard, to the western terminus of Long Island Sound. (See map, Appendix A). This area also includes Gardiners and Peconic Bays between the two forks of eastern Long Island, but the Service concluded that it did not include the inner lagoons and bays along the south shore of Long Island that were part of the New York Bight system, even though considerable interest was expressed by several Congressmen from Long Island for this area to be included as part of the study. Because of both lack of funding and time to include these areas, the Service felt it would be more appropriate to conduct a separate study at some later date of significant habitats in the New York Bight area (Montauk Point, NY, to Cape May, NJ). It should be noted here that four significant fish and wildlife complexes along the south shore of Long Island have been included in this report, primarily because of the interest and assistance by the National Audubon Society identifying the value of and threats to this area, a significant heron rookery complex on Staten Island was also included. Other than these sites, no other areas on the south shore have been included and no analysis has been done in this area to determine other areas of significance, of which doubtlessly there are many.

In addition to the immediate coastline, the study area included coastal rivers and streams from their confluence with the estuary up to the limit of tidal influence or fall line. In the specific case of the Connecticut River, the project boundary was determined to extend to the dam at Holyoke, Massachusetts. Due to the resource limitations of this study, however, and the current interest and consideration by Congress of legislation establishing a Connecticut River National Fish and Wildlife Refuge that calls for further study of the river, this study did not focus as much attention on the upper portion of the Connecticut River as it did on the lower tidal reaches. Should the proposed legislation be enacted, the

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northern, upstream reaches of the river should be carefully explored and evaluated for significant fish, wildlife and plant habitats in a manner similar to the present study.

For the most part, the landward or inland extent of the project's coastal boundary approximates that delineated by the State Coastal Zone Management Programs for New York, Connecticut, Rhode Island and Massachusetts, although in some cases the width of this zone has been broadened to include the estimated inland limit of influence of maritime climate and coastal processes. On the average, the width of this landward coastal zone is about five miles. The seaward extent of the study area is presently delineated by a line drawn from just offshore on the southeastern tip of Cape Cod to southeastern Nantucket Island, and from nearshore waters of Nantucket Island to Montauk Point, Long Island, NY.

B. Coastal Species of Special Emphasis:

The Service's principal approach of identifying significant habitats to be included in the project study area inventory was to focus on those sites of particular regional or national importance to critical life history stages of select coastal species. As an additional part of this process, the Service identified and evaluated areas of significant regional biological diversity and outstanding representatives of regional coastal community types in this same region.

In conjunction with the various project cooperators, the Service developed a list of southern New England and Long Island Coastal Species of Special Emphasis which it used in directing its efforts to identify habitat areas in need of protection. (See Appendix B.) These are primarily species of national or regional significance for which there is a clear Federal trust responsibility under one or more legislative authorities or mandates (e.g., Endangered Species Act, Marine Mammal Protection Act Anadromous Fish Conservation Act, Migratory Bird Treaty Act, Fish and Wildlife Coordination Act) or which are considered in various regional planning documents (e.g., Regional Resource Plans, Fishery Management Plans, North American Waterfowl Management Plan) or are ecologically, commercially or recreationally important within the project study area. Many are species whose populations have seriously declined or are presently declining from historical levels of abundance in the region and/or are especially vulnerable to habitat loss and degradation, human disturbance, competition with exotic or nuisance species, over exploitation or environmental contaminants.

The list of Coastal Species of Special Emphasis contains 153 plant and animal species on which the Service concentrated its data collection in this project. It includes 19 species of finfish, 9 shellfish, 5 reptiles, 2 amphibians, 61 bird species, 6 marine mammals, 7 terrestrial mammals, 12 invertebrates, and 32 plant species. This list is not an exhaustive accounting of all coastal species occurring in this study area, but, rather, represents those species of particular management concern on which the Service focused its inventory efforts.

C. Identification of Significant Habitats of Special Emphasis Species:

In this report, each of the significant, high-priority habitat sites and complexes of habitats is described individually and its approximate boundary delineated on

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a topographic map. These brief descriptions include the general physical and biological characteristics of each area, the significance, uniqueness or value of each area to Coastal Species of Special Emphasis and/or the biological diversity of the region, general ownership patterns, and threats to the ecological integrity of the site and/or species occurring there during critical life history stages. Also included for each site are conservation considerations developed by the Service on how best to protect these areas and the species which depend upon them. More detailed information on each of these sites is available through the Northeast Estuary Office on Charlestown, Rhode Island.

In identifying specific significant coastal habitats in need of protection, the Service focused on: 1) individual populations or occurrences of coastal species of special emphasis; 2) regionally or nationally significant habitat sites of special emphasis species and/or areas of exceptional biological diversity or community uniqueness; and 3) habitat complexes consisting of two or more and often several important and ecologically-linked habitats within a given geographic area. A knowledge of the distinctions between each of these approaches is necessary to understanding the rationale behind the identification and delineation of the sites presented in this report. They are as follows:

1) **Individual Species Occurrences**: Individual occurrences of coastal species of special emphasis were analyzed to identify areas important to one or more critical life history stages of these species, such as spawning, wintering and juvenile growth areas. Data were sought and collected on individual site occurrences, both current and historical, of 153 selected species ranging from small and local resident breeding populations and seasonal clusterings to larger metapopulations, overwintering concentrations, migrating groups and anadromous fish runs. These data were analyzed for the entire four-state coastal and estuary study region. Distribution and locality information was collected and compiled at the most detailed scale and format available, generally on 1:24000 standard USGS topographic quadrangle maps. The bulk of this information was obtained from state Natural Heritage Programs and natural resource agencies (Fish & Wildlife Service, National Marine Fisheries Service) and private conservation organizations, in particular the Nature Conservancy and the National Audubon Society. Individual occurrences and locations were pinpointed on base maps as precisely as the data would allow, either as point occurrences or larger areal delineations, often to the nearest second of latitude and longitude. This information is currently being entered into a computer-mapping program (MapInfo) to facilitate storage, retrieval and graphic presentation of data. Whenever possible or practical, all occurrences of a species in the study area were recorded, including historical locations, regardless of number of individuals at a site, population size, resident of breeding status or regional or national significance. In some instances, however, particularly in the case of widespread species showing considerable movement over the general areas, such as certain waterfowl and fish, only the more stable and regularly-occurring concentrations were mapped.

2) **Significant Habitats:** Using these species occurrence data, important or potentially important, habitat sites were identified. Subsequent discussions with knowledgeable field biologists and field verification were undertaken to confirm the importance of these sites. In addition to obviously significant and exceptional

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sites, i.e., those supporting disproportionately large numbers of densities of a species or where breeding success and productivity are particularly high or above average, the data also served to identify important intermediate sites between major areas that function as migration or recruitment "stepping stones".

Prior to this project, many important habitat areas were already recognized for their value to fish and wildlife by various resource agencies and conservation organizations, at least from a statewide perspective, and were recommended to the study project for inclusion in the final report to Congress as significant habitats in need of protection. Because the Northeast Coastal Areas Study focused its data compilation and analysis efforts primarily on habitats of ecoregional, regional or national significance, differences were obviously to be expected between the two perspectives, although these were surprisingly few. In some instances, habitats viewed as significant or important to biologists or natural resource managers in a particular state may have not been felt to have the same significance when viewed in a broader regional context. Conversely, some areas throughout to be of a lesser value by a state because of their small size were, in fact, determined to be of regional importance as stepping stone areas between major population sites. In other words, candidate sites recommended by the states still needed to be evaluated and analyzed as part of the present study to determine their overall regional or national significance to fish, wildlife and plants in the southern New England - Long Island, NY, study area.

3) **Habitat Complexes:** The Service also identified significant habitat complexes through analysis of species occurrence data and consultation with others. These larger units generally consist of from two to several individual habitat or landform units that are each of importance to a single species or multiple species and which are either contiguous or in a relatively close proximity to each other so as to allow their being recognized as a single, interrelated ecological unit, particularly from a natural resource management perspective. Each of the habitat units will, in many instances, have been individually recognized as being important to either a single species, or a group of species, often by an agency or group that is focused on a particular group of species. What the current study attempted to do is identify obvious linkages between significant sites that allow them to be viewed in a much larger and ecologically relevant context. It will be noted that the majority of significant coastal habitat sites identified in this report are primarily habitat complexes comprised of individual, smaller habitat units. Habitat complexes generally belong to one of these categories:

A. Contiguous, similar habitats, e.g., linear stretches of beaches or sand dune systems running parallel to the coast, ridgetops or riparian corridors.

B. Contiguous dissimilar habitats, through geomorphologically, and often ecologically, related, e.g., barrier beach/lagoon/salt marsh/upland complexes or local wetlands.

C. Discontinuation, though not necessarily remote, similar habitats that form an essential part, if not the entirety, of a species' population or metapopulation.

To a large extent, habitat complexes as viewed here are very close to the bioreserve concept, as defined earlier, currently being explored by the Nature Conservancy and efforts are being made to consider linking the two concepts closer in the future.

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IV. PROTECTION STRATEGIES

A variety of approaches and strategies exists for the protection of valuable wildlife habitats; each provides different degrees of protection and requires different levels of commitment by regulatory agencies, conservation organizations and landowners. These techniques range from the establishment of conservation easements, cooperative management agreements, zoning and land-use regulations, comprehensive planning, enforcement of existing local, state and Federal regulations, tax incentives, mutual covenants and land exchanges to fee simple acquisition. All four states in the study region have enacted special laws to protect coastal wetlands; these laws vary considerably in their degree of protection. Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act of 1977 mandate a strong Federal role for protecting the Nation's coastal wetlands and have proved to be very effective regulatory mechanisms for protecting wetland habitats in general. Federal permits are required for most types of construction in estuarine wetlands. While the regulatory tools to protect coastal wetlands are in place, continued enforcement of existing laws is required to maintain the integrity of the remaining wetlands. The Endangered Species Act and Migratory Bird Treaty Act are also used extensively by the Fish and Wildlife Service and National Marine Fisheries Service to provide protection to species listed under them. In addition to regulation, the Coastal Barrier Resources Act of 1982 remove Federal subsidies and discourages development of designated coastal barriers and adjacent wetlands. Executive Order 11990 - "Protection of Wetlands " - requires Federal agencies to develop guidelines to minimize destruction and degradation of wetlands and to preserve and enhance wetland values.

Successful application of these protection mechanisms can be enhanced through their use in concert with each other and in partnership with all parties involved. Selection of the most appropriate and effective combination of protection techniques and strategies should be determined only through careful consideration of the unique conditions and circumstances that apply to each individual site or complex.

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Attachment #3

Reasons Supporting NEGDEC Determination

The Long Island Sound Study Comprehensive Conservation and Management Plan (CCMP) ***will not*** have a significant adverse effect on the environment, upon evaluation of the criteria in Part 617.11(a) of the State Environmental Quality Review Regulations. On the contrary, ***beneficial*** effects upon the water quality and biota of Long Island Sound (the Sound) may be anticipated as a result of the actions and recommendations called for by the CCMP. The financial costs of all commitments and recommendations have been considered in the CCMP.

As indicated in Part 2 of Appendix A, the actions and recommendations specified in the CCMP are expected to have primarily beneficial consequences in the following areas:

IMPACT ON WATER

- Increase dissolved oxygen (DO) levels in the Sound to eliminate adverse impacts of hypoxia resulting from human activities. This will be achieved through attainment of secondary treatment at all sewage treatment plants discharging into the Sound and by implementing biological nutrient removal retrofits where feasible. Nonpoint source nitrogen control strategies will also be developed and implemented. Further nitrogen reductions are scheduled over a 20-year period. The benefit will be a reduction in nitrogen entering the Sound, which will lead to an increase in DO levels.

- Protect and restore the Sound from the adverse effects of toxic substance contamination by reducing toxic inputs, cleaning up contaminated sites, and effectively managing risk to human users. This will be achieved by developing detailed monitoring and assessment plans for toxins, implementing pollution prevention programs, and remediating contaminated sediments in priority harbors. By preventing toxic contaminants from entering the Sound, future degradation of its waters will be reduced. Unfortunately, some of the Sound's systems will be subject to toxic contamination for a long time, because of contamination of sediments.

- Control the major sources of pathogens, such as combined sewer overflows, nonpoint sources, sewage treatment plant malfunctions, and vessel discharges, and develop site-specific management plans for harbors and embayments. This will result in increasing the amounts of Certified/Approved shellfish growing areas and reducing public bathing beach closures, while adequately protecting public health.

- Reduce the adverse impacts of floatable debris on the environmental quality of the Sound. This will be achieved through combined sewer outfall abatement plans, control of street litter, and regular beach clean-ups.

IMPACT ON PLANTS AND ANIMALS

- Assure a healthy ecosystem with balanced and diverse populations of indigenous plants and animals. This will be achieved by improving overall water quality and restoring natural habitats that have been altered or degraded.

- By reducing nitrogen inputs and thereby increasing DO levels in the Sound, an increase in areas suitable as habitat for marine life is expected.

- By reducing toxic contamination of sediment substrate in the Sound, a benefit will be realized by benthic organisms, fish, and other organisms that feed on benthos that live on or are contaminated by the sediments. These actions would significantly improve and expand habitat for shellfish, finfish, and other marine life.

- Although very few organisms that cause diseases in humans also effect plants and animals, pollution can cause stress to biota, making it more susceptible to pathogens. By reducing pollution, plants and animals may be expected to be more resistant to diseases from pathogens.

- Reduction of floatable debris in the Sound may be expected to benefit fish and wildlife in the Sound by reducing the frequency of incidents where organisms ingest or become entangled in it.

- Assure a healthy ecosystem with balanced and diverse populations of indigenous plants and animals. This will be achieved by improving overall water quality and restoring natural habitats that have been altered or degraded. The benefit of these actions will be a proper functioning ecosystem, which will permit the full range of current and prospective values in human and ecological terms. A healthy ecosystem will also increase the abundance of species listed by the states and/or federal government as endangered, threatened, or of special concern.

IMPACT ON AESTHETIC RESOURCES

- Reduction of floatable debris will restore the aesthetic value of Long Island Sound bathing beaches.

IMPACT ON AESTHETIC RESOURCES (CONT.)

- Restoration of altered or degraded habitats will provide aesthetic improvements to the Long Island Sound area, increasing opportunities for recreational activities such as: boating, swimming, sightseeing, nature observation, hunting, and fishing.

- Preserving and enhancing public access and view corridors to coastal waters will increase the aesthetic value of shoreline areas.

IMPACT ON OPEN SPACE AND RECREATION

- Overall, the actions described in the CCMP will have a positive effect in increasing opportunities for recreational activities, although, in calling for the creation of vessel "No-Discharge" areas in specific harbors and embayments, there is a potential negative impact of precluding operation of vessels with Type I marine sanitation devices (MSDs), which do not have any storage capacity, from these waters. It should be noted, however, that the overwhelming majority of vessels currently manufactured and sold in the Long Island Sound area have Type II and Type III MSDs, which allow for disposal of sewage wastes at shorefront locations, such as marine pump-out facilities. Furthermore, installation of a Type III MSD and disabling a Type I MSD is a relatively inexpensive procedure. Therefore, the impacts from this activity are relatively minor, easily corrected, and will diminish in time as vessels with Type I MSDs become obsolete.

- Encouraging public and private investment in urban environmental infrastructure and reclamation of derelict waterfront properties on the Sound and its tributaries, instead of developing new land, will preserve open space.

- Managing sources of pathogens to the Sound will increase the area available for recreational shellfish harvesting and reduce the incidence of public bathing beach closures while adequately protecting public health.

- By increasing the abundance and distribution of harvestable species in Long Island Sound, especially heavily exploited species, recreational fishing, shellfishing and hunting opportunities will be augmented.

- Preserving and enhancing public access and view corridors to coastal areas will increase recreational opportunities along the Sound.

- By creating a Long Island Sound Reserve System, consisting of areas of land and water of outstanding or exemplary scientific, educational or biological value, more open space will be preserved. However, at some locations it may be necessary to limit public access to protect sensitive resource areas (e.g., restricting beach access during the breeding period of endangered or threatened species of shorebirds). Despite these potential restrictions, overall, the actions described in the CCMP are expected to increase public access to the shoreline areas.

IMPACT ON PUBLIC HEALTH

- Protecting and restoring the Sound from adverse effects of toxic substance contamination by reducing toxic inputs, and cleaning up contaminated sites will diminish risks to public health by reducing human exposure to toxic substances. In addition, human health risks from consumption of contaminated fish, shellfish, and wildlife will be reduced.

- Managing the major sources of pathogens will reduce public bathing beach closures and allow greater areas of shellfish beds to be harvested, while adequately protecting human health.

- Reducing floatable debris will prevent ***perceived*** public health threats from medical waste.

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

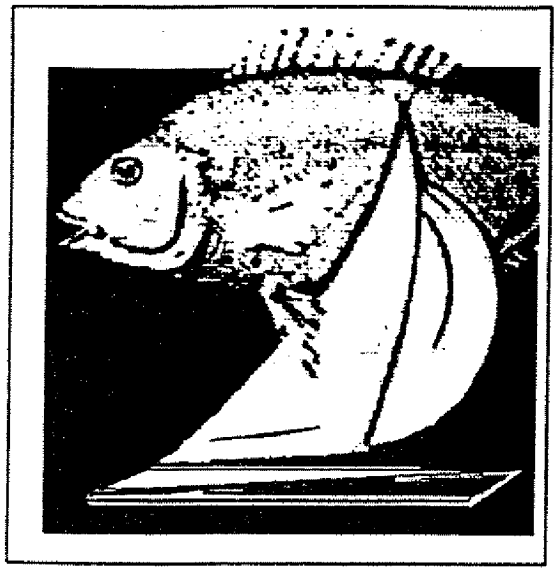
- Cluster development can produce a net environmental benefit, especially in already developed and sewered areas, as long as it is not used to develop in densities greater than the natural capacity of the land.

- Giving priority to appropriate water dependent uses at coastal zone locations assures that they will not have to compete with other land uses that can be accomodated elsewhere in the watershed.

- Nitrogen reductions called for in the CCMP may result in restrictions to development within some communities. Although this will have a positive environmental benefit, it may result in negative economic impacts to watershed communities.

Individual actions that are carried out pursuant to the Long Island Sound Study and described in the CCMP will necessitate individual SEQRA reviews prior to agency adoption or approval.

ATTACHMENT #4



THE LONG ISLAND SOUND STUDY

SUMMARY OF THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN

March 1994