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Long Island Sound - An Estuary of National Significance

The Long Island Sound Study Management Conference involves federal, state, interstate, and local agencies, universities, environmental groups, industry, and the public. The Long Island Sound Study began in 1985 when Congress appropriated funds for the U.S. Environmental Protection Agency and the states of Connecticut and New York to research, monitor, and assess the water quality of Long Island Sound. With the Clean Water Act Amendments in 1987, Section 320 of the Act officially established a National Estuary Program. At the request of the states of Connecticut and New York, Long Island Sound was officially designated an Estuary of National Significance under this new program, and a Management Conference for the Long Island Sound Study was convened in March of 1988.

Purpose of the Long Island Sound Study

The Management Conference was charged with developing a Comprehensive Conservation and Management Plan for protecting and improving the health of Long Island Sound while ensuring compatible human uses within the Sound ecosystem. The plan characterizes the priority problems affecting Long Island Sound and identifies specific commitments and recommendations for actions to improve water quality, protect habitat and living resources, educate and involve the public, improve the long-term understanding of how to manage the Sound, monitor progress, and redirect management efforts. Wherever possible, the plan contains agency commitments to take actions addressing these issues. This summary document highlights the major elements of the plan.

Priority Areas of Concern

The Management Conference has identified six problems that merit special attention: (1) low dissolved oxygen (hypoxia), (2) toxic contamination, (3) pathogen contamination, (4) floatable debris, (5) the impact of these water quality problems, and habitat degradation and loss, on the health of living resources, and (6) land use and development resulting in habitat loss and degradation of water quality. The Management Conference has focused its efforts and resources on the most pressing problem among these, low dissolved oxygen, which affects a substantial portion of Long Island Sound in late summer, but has addressed all priority problems.

Connections to Long Island Sound

Long Island Sound is a national treasure, to be prized for its beauty, abundant and diverse resources, and recreational and commercial opportunities. For many, it is a source of inspiration and renewal. For others, it is the basis of economic survival. In spite of differing perspectives, people share a conviction that Long Island Sound (the Sound) is worthy of preservation, restoration, and protection.

Perhaps we can never bring the Sound back to the condition it was when the explorer Giovanni Verrazano arrived in the 16th century. However, with a

clearly articulated vision for the Sound as a guide, we can make a difference. Distilled from the input of National Audubon Society-sponsored citizen hearings in 1990, and clearly stated in its publication, *Listen to the Sound*:

"The vision . . . for the Sound is of waters that are clean, clear, safe to swim in, and charged with life. It is a vision of waters nourished and protected by extensive coastal wetlands, by publicly accessible, litter-free beaches and preserves, and of undeveloped islands. It is a vision of abundant and diverse wildlife, of flourishing commercial fisheries, of harbors accessible to the boating public, and of a regional consciousness and a way of life that protects and sustains the ecosystem."

The Long Island Sound Study is a reflection of the fact that people care about the Sound. Countless hours have been spent by concerned citizens, environmental managers, government officials, and research scientists; a seemingly endless series of committee meetings have taken place; and millions of dollars have been spent on understanding the Sound's problems -- all in the interest of restoring the Sound. What is Long Island Sound? Long Island Sound is an estuary, a place where salt water from the ocean mixes with fresh water from rivers and the land. Bounded by Connecticut and Westchester County, New York, on the north and by Long Island on the south, it is approximately 110 miles long (east to west) and about 21 miles across at its widest point, with mid-Sound depths between 60 and 120 feet (Figure 1 - not available online).

Like other estuaries, Long Island Sound abounds in fish, shellfish, and waterfowl. It provides feeding, breeding, nesting, and nursery areas for diverse animal and plant life. But Long Island Sound is unique in other ways. Unlike other estuaries, Long Island Sound does not have one connection with the sea: it has two. Rather than having a major source of fresh water at its head, flowing into a bay that empties into the ocean, Long Island Sound is open at both ends, through The Race to the east and through the East River and New York Harbor to the west. Most of its fresh water comes from a series of south-flowing rivers, including the Connecticut, the Housatonic, and the Thames, whose drainages reach as far north as Canada. The Sound's 16,000 square mile drainage basin also includes portions of New York City and Westchester, Nassau, and Suffolk counties in New York state.

The Sound combines this multiple inflow/outflow system with a highly convoluted shoreline and a complex bottom topography. Taken together, they produce unique and complex patterns of tides and currents.

How is the Sound Used and What is its Value?

The Sound is also unique in the degree to which it provides recreational and commercial value to the region. It lies in the midst of the most densely populated region of the United States. More than 8 million people live in the Long Island Sound watershed and millions more flock yearly to the Sound for recreation. Research commissioned by the Long Island Sound Study estimated that about \$5 billion is generated annually in the regional economy from boating, commercial and sport fishing, swimming, and beachgoing. The ability of the Sound to support these uses is dependent on the quality of its waters, living resources, and habitats. The regional economy also benefits from many other valuable uses of the Sound, such as cargo shipping, ferry transportation, and power generation. With the uses it serves and the recreational opportunities it provides, Long Island Sound is among the most important estuaries in the nation.

While Long Island Sound is a demonstrable economic resource, there are other values that are less quantifiable. Natural habitats and good water

quality contribute to shoreline residential property values. On another level, the Sound has attributes, aesthetic and otherwise, that can inspire a special bond between people and the water. While it is difficult to assign a price tag to such things, Long Island Sound's intrinsic value as a natural resource is worth protecting and preserving for future generations.

The current value and quality of the Sound are partly the result of the investments in water pollution control programs made in the two decades since the passage of the Clean Water Act. These programs have led to measurable improvements in pollution control and water quality, in spite of ever-increasing numbers of people and activities on the Sound and within its watershed. Obvious sources of pollution are now regulated and controlled through permit programs, tidal wetlands are protected, and major efforts in the states of Connecticut and New York to build sewage treatment plants and control industrial discharges have helped to restore degraded waters. More recently, with programs focusing on the ecosystem as a whole, the approach has become more comprehensive to include increased efforts in stormwater and nonpoint source pollution control.

These efforts have taken place because of increased awareness and concern among citizens and the responsiveness of public officials. Without the substantial investment already made in environmental protection, the value of the Sound would be far less than it is today.

Problems in Long Island Sound

In spite of these efforts, problems remain. The quality of Long Island Sound is still far from what it should or can be. Many of the uses or values of the Sound are still impaired from old abuses. Other uses or values face new threats.

- Large areas of the Sound are impaired as habitat for fish and shellfish because of low dissolved oxygen levels, a condition called hypoxia.
- The productivity of many wetlands, intertidal areas, and other habitats has been diminished by development and pollution.
- Some bay and harbor bottoms are contaminated with toxic substances.
- Health advisories warn against too much consumption of Long Island Sound bluefish, striped bass, eels, some types of waterfowl, and lobster and crab hepatopancreas (more commonly known as tomalley) due to elevated levels of toxic chemicals.
- Beaches suffer periodic closures and many of the Sound's prime shellfish beds have been closed for years due to indications of pathogen contamination. People can become sick by swimming in contaminated waters or by eating raw or partially cooked shellfish harvested from contaminated waters.
- Trash and litter mar the Sound's waters and beaches and can pose a hazard to living resources and to navigation.

For some, these impairments affect the enjoyment of the Sound; for others, their livelihood.

Causes of the Problems

Always considered a desirable place to live and recreate, the area around Long Island Sound experienced a major population influx after World War II. Residential, commercial, and recreational development increased pollution, altered land surfaces, reduced open spaces, and restricted access to the Sound. The use of the Sound as a place to dispose of human and other wastes increased dramatically. The "paving over" of the land increased runoff and reduced the filtration and processing functions of natural landscapes.

Habitat destruction and alteration throughout the watershed harmed native wildlife populations and reduced the breeding grounds and nursery areas for a variety of species.

Though slowed considerably due to better management, pollution and habitat loss continue to be problems in Long Island Sound.

- Over a billion gallons of treated effluent, which contains oxygen-demanding material and the nutrient nitrogen, are discharged each day from sewage treatment plants to the Sound. The nitrogen overfertilizes the Sound, fueling the growth of marine plants. When the plants die, they sink to the bottom and decay, using up oxygen in the process. Other sources of nitrogen include runoff from overfertilized lawns and gardens and atmospheric deposition from vehicle and power plant emissions.
- Toxic chemical substances produced through human activity have found their way into the Sound and persist in elevated levels in some bottom sediments. In the past, much of this material came from industrial sources, but rigorous compliance with pollution control programs has reduced this source substantially. Continuing sources today include urban runoff, sewage treatment plants, vehicle exhaust emissions, household chemicals, and pesticides. These contaminants affect the health of plants and animals and human consumption of species that concentrate these substances can pose significant health risks.
- Pathogens, disease-causing, microscopic bacteria and viruses, enter the Sound's waters through inadequately treated human sewage and domestic and wild animal wastes. Some of the primary sources of pathogens are older sewer systems that have combined stormwater and sanitary systems that overflow during rainfalls (called combined sewer overflows), sewage treatment plant malfunctions, illegal connections to storm sewers, and vessel sewage discharges.
- Floatable debris comes from people carelessly disposing of their trash, transforming it into litter that enters the Sound through runoff, stormwater discharges, and combined sewer overflows.

In summary, Long Island Sound is stressed by people generating wastes that flow into the estuary and by land uses and practices altering the Sound's natural habitats. These actions degrade the Sound's water quality, disrupt its ecosystem, and impair the uses upon which people depend.

What if No Action is Taken?

Without aggressive and sustained action, the water quality of the Sound will deteriorate, overshadowing recent improvements. If action is not taken to further reduce and control the discharge of pollutants and to restore and maintain habitats, continued growth and development around the Sound will result in even lower oxygen levels, beach and shellfish area closings will increase, and populations of fish and wildlife will decline.

People will turn away from the Sound as a source of livelihood and recreation. The regional economy will shrink as people find other places to boat, to fish, and to swim. Perhaps the most vivid and dire consequence of no action will be the degradation of the entire ecosystem. Long Island Sound will not realize its full value to the region without concerted and committed action.

The Plan

In 1985, Congress directed the U.S. Environmental Protection Agency (EPA), in cooperation with the states of Connecticut and New York, to sponsor the

Long Island Sound Study. A Management Conference, involving federal, state, interstate, and local agencies, universities, environmental groups, industry, and the public was established. The Management Conference identified and investigated the Sound's most significant problems and produced a draft management plan in January 1993. Public meetings were held to solicit comments on the draft, many of which were incorporated into the final version of the plan.

The plan describes ongoing programs and lists commitments and recommendations for actions that specifically address the Sound's priority problems. Its implementation will have a range of benefits. Degradation of the Sound will be halted. Many of the Sound's uses, impaired and impeded over time, will be recovered. Beach closings will be reduced, shellfish harvest acreage will expand, and there will be more life-sustaining oxygen and fewer fish kills. Habitats will be reclaimed and restored. Diverse and healthy plant and animal life, including endangered species, will be supported. The various water quality-dependent uses, so important to the regional economy, will achieve some level of long-term security as an improved Long Island Sound invites visitors to return often.

To achieve this vision, the plan calls for a sustained and cooperative effort among the states of Connecticut and New York, the EPA and other federal agencies, local governments, and the private sector. But the fate of the Sound depends on more than just the commitments of government agencies and regulated entities; it depends on the will and desire of the people of the region.

There are many ways each individual can contribute. First, citizens can inform themselves about Long Island Sound. A good start is to learn more about the problems facing the Sound and what needs to be done about them. Second, people can voice their concerns directly to elected officials and government agencies. Third, people can join marine user and citizen's groups to combine their voices with others and demand a cleaner Sound. Fourth, people can take responsibility for their own actions by making changes in lifestyle to reduce the amount of pollution they generate -- many small changes will add up to protect the Sound.

The following sections summarize the management plan for Long Island Sound. Each priority problem identified by the Management Conference is characterized and specific commitments and recommendations for actions are highlighted. The last section summarizes the coordination, involvement and education, and funding needed to support successful implementation of the plan.

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